

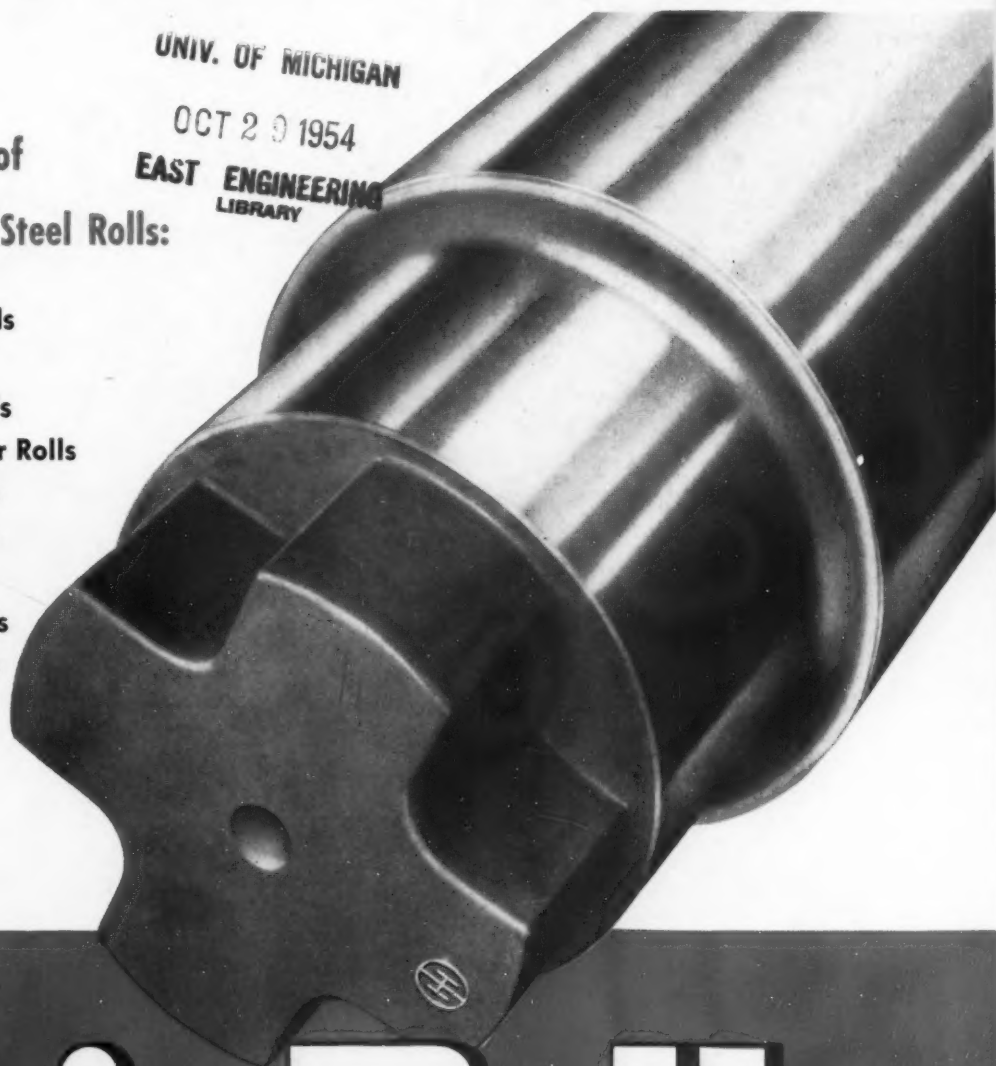
The **Iron Age** *A Chilton Publication*

THE NATIONAL METALWORKING WEEKLY • OCTOBER 28, 1954

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Designed for Gun Maintenance of Furnace Structures

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SAVE TIME, SAVE MONEY, BALANCE FURNACE LIFE

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GUNCHROME-M...the chrome-magnesia refractory for quick, hot repair of critical furnace areas

● If you are concerned with furnace operation and maintenance, you'll want to know more about Gunchrome-M.

This unique chrome-magnesia refractory is applied by air emplacement to back walls, skewbacks, front walls, end walls, arches, uptakes, and other critical areas.

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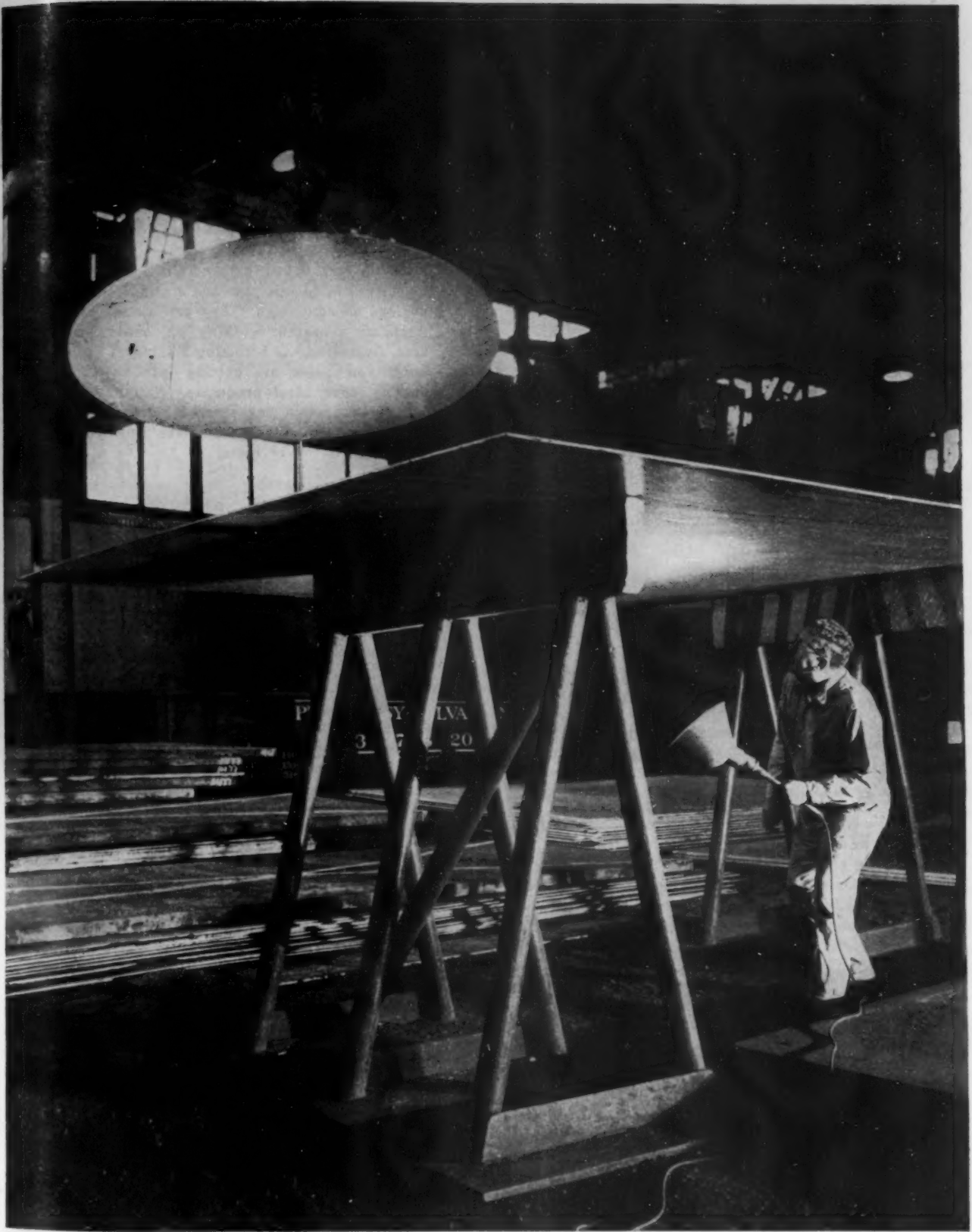
1—balanced furnace life through maintenance of critical areas. 2—reduced brick replacement at rebuild by periodic maintenance throughout furnace campaign. 3—the ability to meet emergency needs for extending furnace life beyond normal campaign expectancy.

Ask your Basic Sales Engineer for facts and figures on Gunchrome-M as revealed in actual application reports. Or write for Gunchrome-M Bulletin G-101 illustrated above.

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October 28, 1954

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NEWS DEVELOPMENTS

PLASTIC PIPE INDUSTRY GROWING UP — P. 41

Producers of plastic pipe are moving fast to overcome obvious shortcomings. They are setting up standards, financing research, working on newer, better products. Overselling is becoming a thing of the past. More large companies are getting into the business, including four steel producers. National Tube is the latest. Production has started at Gary and the firm hopes to begin distribution late this year. Industry sights are on lower costs.

METAL FATIGUE CAUSED JETLINER CRASHES — P. 43

Investigators pin blame for crash of two British Comet jet airliners on fatigue failure in cabin structure. Internal air pressure at 30,000 ft ripped bodies open like a blowout. Passengers thrown through hole in split second. Raised 70 pct of one plane from sea bottom. Modified Comets now flying.

FASTENERS POINT TO UPTURN IN INDUSTRY — P. 51

Industrial fasteners, one of the bellwethers of industry, are in an upsurge, getting stronger week by week. Major bright spots are auto industry and heavy construction. Biggest disappointment is railroads. New packaging standards are expected to help.

WHY THE HOUSING BOOM WILL CONTINUE — P. 61

Some of the pessimists figure the home building boom is about due to peter out. But it won't. Factors that will keep it going: (1) Population is growing at the rate of 1 person every 12 seconds, (2) there's a trend away from doubled-up families; (3) high birth rate is causing many families to seek larger homes; (4) high wages give young people economic independence at an early age; (5) U. S. population is shifting to West and South, from farms to suburbs.

SWEEPING CHANGES ON '55 CHEVY, PONTIAC — P. 64

GM's two lowest priced lines get the full treatment in new models. Bodies are wider, lower, have more window area, two-tone styling. Both have powerful V8 engines. Chevrolet will keep its six.

SEE MILITARY PURCHASING BOOST IN '56 — P. 69

Planners expect fadeout on the Pentagon economy program in fiscal 1956. But it won't be a shoot-the-works buying spree unless a hot war develops. Most items will go to Europe, some to Asia.

ENGINEERING & PRODUCTION

NICKEL PLATE GIVES CORROSION PROTECTION—P. 87

A new method for electrodepositing nickel on mild steel plate in thicknesses of 0.006 to 0.020 in. provides low-cost protection against corrosion. Thickness is not controlled by thickness of the steel. Any grade of mild steel can be clad.

IMPROVED RODS BEAT CRACK SENSITIVITY — P. 90

Low-temperature electrodes used in conjunction with improved welding techniques were teamed up to overcome a tough repair job on electromagnets. Welds can be made free of crack sensitivity by the use of proper welding rods and techniques.

COLD ROLLED SERRATIONS IMPROVE SHAFTS — P. 92

Serrations formed by cold rolling greatly improve the service life of steering gear worm shafts by increasing their resistance to tension, shear and fatigue loading. Process gives greater accuracy at lower cost.

INDUCTION MELTING FOR VERSATILE FOUNDRY—P. 95

One foundry has installed high-frequency induction melting equipment to make large ferrous castings. The range of compositions covers not only nonferrous, but stainless, carbon and alloy grades and many special high alloys. Physical and chemical quality is improved.

TOUGH HEAT TREATING PROBLEMS SOLVED — P. 99

Austempering and martempering offer significant production advantages in heat treating. Increased control of physical properties and more uniform as well as higher hardness may be obtained. Application of methods to production problems requires understanding of metallurgy and operating factors involved.

MARKETS & PRICES

GEAR TOOL PAYMENTS TO NEW DEPRECIATION — P. 45

A new industrial financing plan matches time payments to depreciation schedules in the new tax law. Entire payment may be charged as expense. For firms in 52 pct federal income tax bracket, 52 pct of payments would have gone to government. Plan expected to increase incentive to buy tools, construction equipment, and lift trucks. Initial response enthusiastic.

START TUG-OF-WAR ON SCRAP EXPORTS — P. 48

Officials predict 1.2 million tons of scrap iron and steel may be exported in 1954. Export licenses have zoomed from 176,000 tons in first quarter to 755,000 tons in third. BDSA task group studies problem. Expect request for immediate imposition of quotas. But scrap trade will fight, saying a surplus is generated and that it's useless to limit scrap without restricting ore, pig iron and steel.

STEEL OUTPUT TO RISE EIGHTH WEEK IN ROW — P. 123

Steel production is expected to rise again this week, marking the eighth consecutive week of increase. A strong influx of orders from auto producers is putting more steam into a market that was already recovering. Demand is expected to continue strong well into 1955, with little letdown in latter part of December.

SHEET DEMAND LEADS RISING STEEL MARKET — P. 124

Automotive buying has created a scramble for cold-rolled sheets in Midwest. Some mills booked through December. Signs of strength showing on all products. Seasonal decline won't hurt tonnage total.

COPPER USE HITS PEAK IN SEPTEMBER — P. 126

Statistics for September show that U. S. copper consumers used more of the metal than in any month since October 1953. This took a huge slice out of stocks but government copper is beginning to fill in.

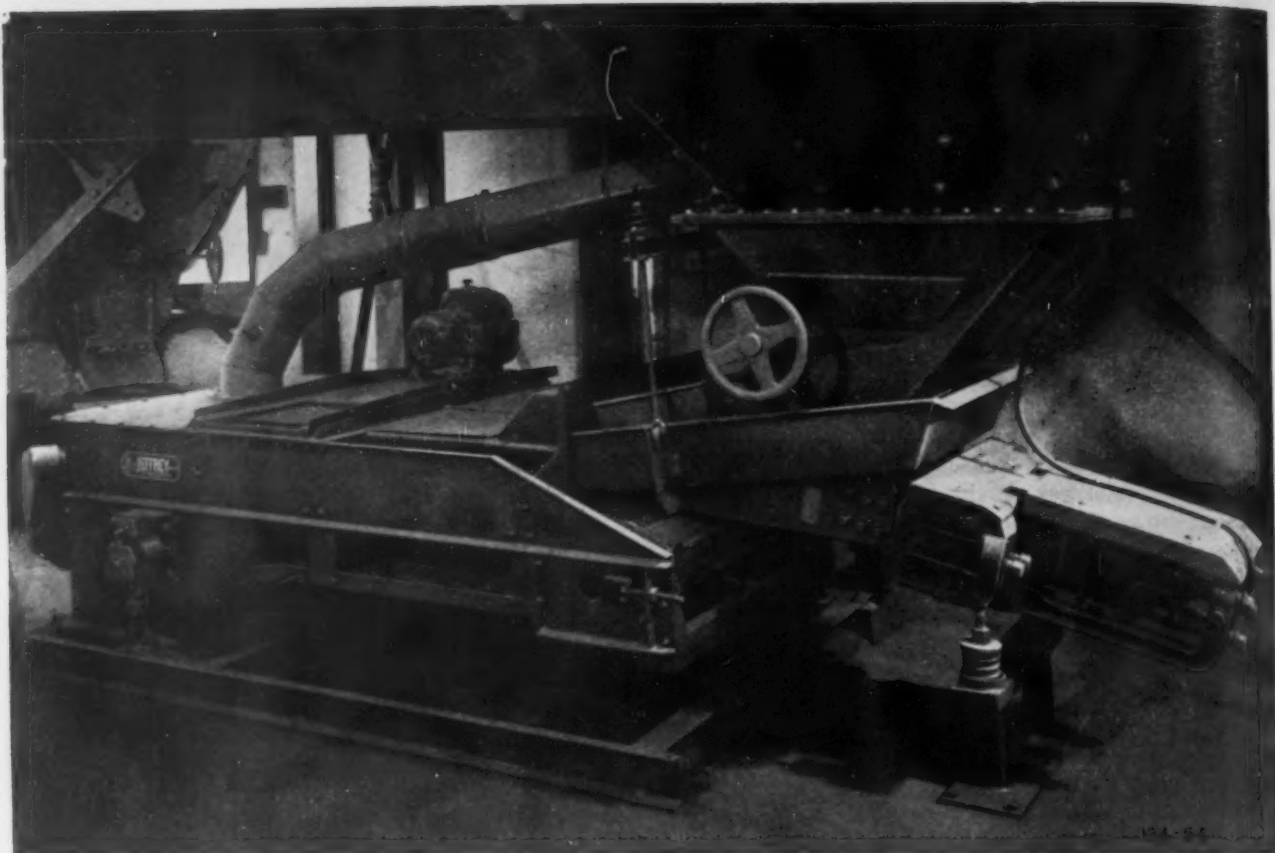
NEXT WEEK:

MODERN STEEL PLANT FEATURES CONTINUOUS CASTING

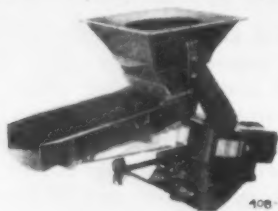
Some of the most modern equipment ever designed for steel production has been installed at Atlas Steels, Ltd. in Canada. Main feature is a commercial continuous casting machine for stainless and specialty steels. Other advanced equipment includes a planetary mill and continuous high-head heating furnace.

EAST GERMANS MARKETING LOW-PRICED TOOLS

Red-controlled tool builders offer lines of "old-look" machine tools to receptive European buyers. Equipment is of good quality, slightly out-of-date, appeals to cost conscious plants, machinists who prefer simplicity. Prices are flexible, can be cut to serve political ends, beat all competition.

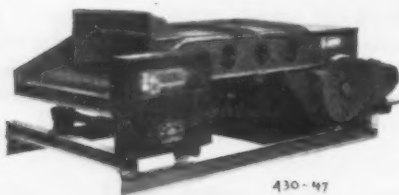


ABOVE: JEFFREY-TRAYLOR WAYTROL
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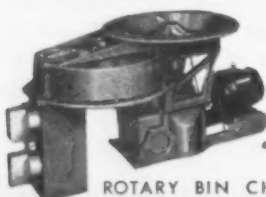
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ELECTRIC VIBRATING FEEDER



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PLASTIC PIPE: Industry Growing Up

Producers moving fast to overcome shortcomings . . . Setting up standards, financing research projects, developing better products . . . Proper application of the product stressed, too—By J. B. Delaney.

♦ **THAT LUSTY** infant, plastic pipe, is showing signs of growing up.

The industry is doing something about some obvious shortcomings. It is setting up standards, financing research projects, working on the development of better products. Overselling is becoming a thing of the past.

One source describes the three principal needs of the industry today as (1) standardization from raw material to consumer; (2) development of better products, and (3) proper application of the product.

Industry leaders point to progress in all three directions while conceding that there's a lot still to be done. They say that the days when nearly every producer was flying by the seat of his pants are largely over. Large, more stable companies are getting into the business, including four steel producers.

National Tube Div. of U. S. Steel Corp. is the latest steel producer to enter the plastic pipe field. After months of development and pilot plant work, the company began production at Gary works. It hopes to begin distribution late this year in a size range of ½-in. to 6-in. diam.

National Tube plans to concentrate on production of polyethylene and poly vinyl chloride (PVC) thermoplastic pipe. Raw materials used will be strictly "on-grade" virgin resins which will produce a prime product suitable for all applications, including even the possibility of transmission of drinking water.

National Tube sales will be headed by R. K. Henderson, Manager of Sales—Plastic Pipe. Working closely with Henderson will be C. Anderson, Assistant Manager—Planning and Development.

Republic Steel Corp. has been producing and distributing ther-

moplastic pipe in ½-in. through 4-in. sizes at its plant in Magnolia, Ark., formerly owned by the Owings-Sharpe Co.

Youngstown Sheet & Tube Co., which entered the thermosetting (glass-reinforced) end of the business, is not actively promoting its sale, but is concentrating on developing a new, better product and changing its manufacturing processes.

A. M. Byers Co. has announced it is teaming up with a pipe producer whose product it will sell and distribute. A. B. Drastrup, president, indicated the pipe will be a specialty product.

Spring Up Quickly

As stability increases, the fringe operators who took advantage of a good thing during the post-war boom are finding it harder to compete. Many of them already are on their last legs, are ready to sell out to the highest bidder.

Industry sources estimate there

Proposed Polyethylene Pipe Size Specs

Dimensional specifications and tolerances for flexible standard wall polyethylene pipe as proposed by Society of the Plastics Industry.

Designation: TP-2-52.

Nominal Size	Inside Diameter	Wall	Wall Tolerances (plus or minus)	Inside Diameter Tolerances		Weight	
				Plus	Minus	Minimum	Nominal
In.	In.	In.	In.	In.		(Lb per 100 Ft)	
½	0.622	0.109	0.006	0.010	0.010	9.5	10.3
¾	0.824	0.113	0.006	0.010	0.015	12.7	13.3
1	1.049	0.133	0.007	0.010	0.020	18.6	19.6
1¼	1.380	0.140	0.007	0.010	0.020	25.4	26.7
1½	1.610	0.145	0.008	0.015	0.020	30.2	31.8
2	2.067	0.154	0.008	0.015	0.020	42.7	45.0
2½	2.469	0.203	0.009	0.015	0.025	65.9	69.4
3	3.068	0.216	0.010	0.015	0.030	85.5	90.0
4	4.026	0.237	0.012	0.015	0.035	119.0	125.0
6	6.065	0.280	0.015	0.020	0.035	221.0	233.0

SPECIAL REPORT

may be as many as 80 companies in the business, including little back-alley shops. But only about 10 of these are classified as "big" and some 20 companies account for 80-90 pct of production.

The industry's growth seems to be assured. Plastic pipe already has a firm footing in agriculture, mining, oil, gas, and food and chemical processing. But it's virtually impossible to estimate its potential with any assurance of accuracy. Increases in temperature and pressure limits could open up new markets, expand others.

Plastic pipe got its start in 1942, but remained virtually dormant until 1948 when sales hit the \$100,000 mark. Shortages of steel and other metals in the ensuing years literally skyrocketed production and sales. In 1952 sales totaled approximately \$15 million; in 1953, \$25 million and this year the figure is expected to reach \$30 million. Some sources believe that by 1960 the industry will be producing and selling some 40,000 tons worth nearly \$100 million.

Guard Secrets

The industry is afflicted with some of the ills peculiar to a young and growing field.

Production techniques are jealously guarded. Even basic information that is freely exchanged in

other industries must be worked up from scratch by newcomers to the field. Standard extrusion machines can be bought from a number of sources, but the extruder has to develop his own production procedures. This attitude is particularly baffling to the steel companies who are accustomed to exchanging information on production problems.

Perhaps the chief reason for secrecy is the relatively small investment necessary to get into the business. A quarter of a million dollars is enough to get a fair-sized company underway.

During the post-war boom, the industry suffered from lack of research and development. Most producers could not afford it or were not interested. Demand was strong enough that anybody with an extruder could sell everything he produced. And the industry got a bad name in the process.

But within the last several years, the industry, through its Society of the Plastics Industry, has launched several worthwhile projects.

A two-year study begun last December at Battelle Memorial Institute proposes to establish test methods and procedures and develop other technical data with the objective of establishing voluntary industry standards. The industry's Thermoplastic Pipe Div. already has developed dimensional and performance standards dealing with nominal sizes, inside diameters, tolerances, and nominal

Plastic Pipe Production

(Net Tons)

1950	2,600
1951	3,900
1952	6,000
1953	7,500
1954	9,800
1960	40,000

weight per 100 feet of pipe. A study now in its third year at the National Sanitation Foundation, affiliated with University of Michigan's School of Public Health, has developed data indicating suitability of certain grades of plastic pipe for transmission of drinking water.

Tackle Costs

Industry leaders also are focusing their attention on cost reduction. Raw materials costs, now running about 41¢ per lb., are expected to decline over 25 pct with entry of new companies into the field and the writing off of development costs. Polyethylene, for example, is now produced by two companies—Bakelite and Du Pont. But six other companies are preparing to get into production—Allied Chemical, Dow, Monsanto, Eastman Chemical Products, Spencer Chemical Co., Phillips Petroleum, National Petrochemical Co.

Increased extrusion speeds are another potential means of reducing costs. With most extruders having barrels of 3½-in. and 4½-in. ID, average extrusion speed is 100-110 lb per hr. Large diameter machines will extrude at the rate of 200-220 lb per hr. Producers are working to increase output by stepping up screw speeds, and through die design.

Average selling price of polyethylene pipe is approximately \$1.12 per lb. Extruders gross about 69 cents over cost of raw materials, but necessity of additional compounding with "alloying" elements such as carbon black reduces the return to 66 cents.

Plastic pipe is handicapped by heat and pressure limitations. Generally speaking it is not useful above 150°F.

The chief uses to date have been in agriculture (jet wells and irrigation), mining (coal and ore), petroleum (salt water disposal, gathering lines, sour crude transmission), natural gas, processing.

Proposed Butyrate Pipe Size Specs

Dimensions and nominal weights for solvent welded (SWP) lightwall, Grade S butyrate pipe as proposed by Society of the Plastics Industry. Designation: TP-3-52.

Nominal Size	Outside Diameter	Wall Thickness	Nominal Lb per 100 Ft
In.	In.	In.	
½	0.600	0.050	5.0
¾	0.855	0.053	7.5
1	1.140	0.070	13.5
1¼	1.420	0.085	20.0
1½	1.730	0.115	32.0
2	2.250	0.125	45.0
2½	2.570	0.125	52.0
3	3.250	0.125	65.0
3½	3.660	0.150	89.0
4	4.100	0.150	100.0
5	5.110	0.180	148.0
6	6.220	0.230	233.0

COMET: Fatigue Caused Jet Crashes

Raise 70 pct of plane from sea bottom . . . Pin blame on fatigue in cabin . . . Internal air pressure at 30,000 ft ripped body like blowout . . . Threw passengers out in split second . . . Modified Comets now flying.

♦ **METAL FATIGUE** is blamed for virtually exploding the fuselages of two Comet jet airliners which crashed into the sea off Italy early this year. This conclusion is the result of a 9-month investigation and was reported to an official court of inquiry in London last week.

Story behind the 120,000-word report of the investigation is truly a saga of human determination and perseverance.

It concerned the first of two Comet crashes, a tragedy which took 35 lives last Jan. 10. A Comet I, a jet-powered airliner built by the British deHavilland Co., took off from Rome and ended its flight in the sea off Elba.

Second crash, which took 21 lives, was similar.

Raised Most of Comet

The two disasters were a tremendous blow to the British aviation industry which had won the world lead in jet-powered airliners with the Comet.

First step, considered impossible by almost everyone but those who did it, was recovery of the wreck from the sea. Literally, thousands of fragments were recovered with the aid of underwater television cameras by the Royal Navy. Attesting to their thoroughness, 70 pct of the plane's weight was reclaimed.

Fragments were returned to England and assembled in their former positions in a frame.

Meanwhile, other experimenters were busy putting other Comets through their paces on the ground and in the air. They flew Comets over the fatal flight paths—still not knowing what might have caused the two crashes. In their



FATIGUE DESTROYED this Comet and all persons aboard. Terrific salvage job by Royal Navy brought 70 pct of it back from bottom of sea.

extensive testing, the scientists blasted and hammered to bits two more of the \$1,400,000 craft.

Find No Sabotage

Sir Lionel Heald, attorney for the Crown, submitted the findings of the investigators to the court. He stated that there was absolutely no evidence of sabotage in the Elba crash and that there is positive evidence that points toward accidental destruction.

All four engines were recovered, tested and absolved of blame. Neither is there any reason to believe the crew was at fault.

Blame is fixed on a fatigue failure in the cabin somewhere near a window. Since the plane was probably at about 30,000 ft altitude, there was a considerable difference between internal and outside air pressure and this ripped the plane's body wide open. Effect was similar to a tire blowout.

Reconstruction of the distorted Comet fragments indicates that the crash started with the sudden appearance of a force within the cabin which threw most of the passengers forward and upward. It apparently threw some of them through a split in the fuselage without touching it. It happened

with such explosive violence that it took only a third of a second to practically empty the cabin.

Stressing the unpredictable nature of metal fatigue, Sir Lionel indicated that no one could have foreseen the problem and that nobody could be blamed for the accidents. However, tests show that stresses in the fuselage, especially near windows, had exceeded the level calculated to give a safety factor of two.

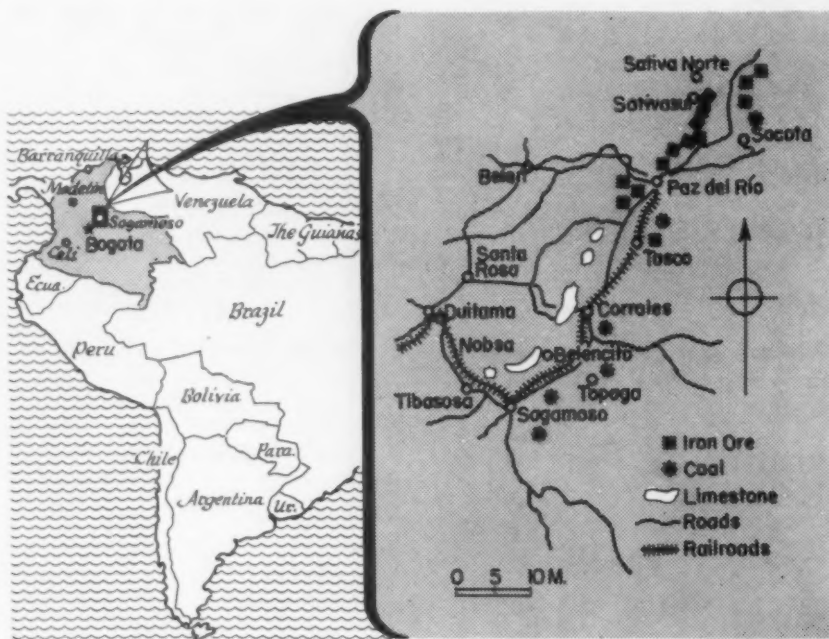
It is assumed that the second Comet tragedy was similar.

In Sir Lionel's words, "The report wrote the final chapter in one of the most remarkable pieces of scientific detective work ever done." But it may have more far-reaching effects in the epilogue.

Comets with "minor" structural modifications have now been cleared to fly again. But the jet airliner is an aviation infant still in its most formative stages. The tragic toll of lives in the two crashes and the results of the "autopsy" could well bring on a re-evaluation of commercial jet standards in England. Repercussions could be felt on this side of the Atlantic, where several Comets are on order for U. S. airline companies.

STEEL: Open Colombian Plant

Begin coke, pig output at South America's newest steel mill . . . Pour first ingot next month . . . Rated capacity is 150,000 tons; will meet 63 pct of nation's steel needs.



MAP SHOWS location of Colombia's new Paz del Rio steel plant.

◆ **ANOTHER BRICK** in the foundation of South America's steel industry was cemented into place recently with formal opening of Colombia's new steel plant.

Recently renamed Acerias Paz del Rio, the plant, costing about \$70 million, has a rated capacity of about 150,000 tons. First ingots will be poured early next month. Coke and pig iron output has been started.

Equipment includes one blast furnace, three basic bessemers and one electric for alloy steel production. In addition there is a hot mill, wire drawing equipment, a power plant, a battery of coke ovens and a coal chemical recovery system.

Initial production will be only about 80 pct of capacity. It will include 8000 tons of steel rails; 750 tons of rail and track accessories; 2400 tons of blooms; 1200 tons of castings; 8650 tons of beams, angles and structural shapes; 14,250 tons of bars and shapes; 32,250 tons of

reinforcing bars and rods; 8000 tons of wire for nail manufacture; 10,000 tons of barbed wire; 3000 tons of galvanized wire and 8500 tons of black wire and other wire products.

Based on last year's consumption, Paz del Rio is expected to turn out some 63 pct of Colombia's requirements for rails, bars and rods, barbed wire and structural steel shapes. The mill's output is guaranteed a market under a recent decree requiring that Paz del Rio steel be used on all Colombian government projects.

Plans are now underway to enlarge the mill's capacity from its present 122,000 ton figure to more than double or about 250,000 tons. Bids have already been requested for another blast furnace and a cold rolling mill. Cost of the expansion is estimated at \$100 million. Arthur G. McKee & Co. of Cleveland is completing a study of steelmaking furnace expansion.

With these additions, Paz del Rio will be able to turn out flat-rolled steel for such products as tin cans, enameled dishwashers, water heaters and the like. The new equipment would also enable the mill to supply an automobile industry in Colombia.

Henry J. Kaiser, for one, has proposed the establishing of a Jeep and truck factory in Colombia to turn out 5000 units a year.

Follow U. S. Designs

More than \$23 million in French capital, loaned by the Bank of Paris and the Low Countries, made it possible for the company to buy most of its present heavy equipment in France.

However, plant designs were handled by the Koppers Co., Inc., of Pittsburgh, and general engineering by Arthur G. McKee & Co.

And the French manufacturers agreed to follow American standards wherever possible and submit designs to these United States companies for approval.

Also, many of the French firms engaged in building Colombia's mills are affiliated with US companies under licensing agreements.

This will permit replacement by U. S. equipment in the event that they can't make delivery.

Raw Materials Handy

Delattre et Frouard, which headed up the financing group, is associated with the Freyn Engineering Department of Koppers Co.; Disticoke, builder of the coke plant, is also associated with Koppers; and Alsthom, in charge of building the power plant, has licensing agreements with General Electric.

Plant itself is located at Belencito (Little Bethlehem). Coal, iron ore and limestone deposits are within a radius of 16 miles of the plant.

Big Buildup for J & L

Jones & Laughlin Steel Corp. announced it will spend \$55 million in 1955 for expansion and improvement. Expansion program includes a continuous sheet galvanizing line at Pittsburgh and electricweld pipe mill at Aliquippa, Pa.

Also planned for Aliquippa are facilities for producing new joist sections and special seamless tube products and improved wire and wire specialty manufacturing equipment.

TOOLS: Gear Payments to Depreciation

New financing plan matches time payments to faster depreciation schedules in new tax law . . . Normal down payments still apply . . . Initial client response enthusiastic . . . May aid sales—By W. V. Packard.

♦ A NEW APPROACH to industrial financing may turn out to be an important sales aid to builders of machine tools, construction equipment, lift trucks, and related items.

The new financing plan is geared to take advantage of benefits in the new tax law by matching payments to the new, faster depreciation schedules.

The plan was first presented last week to clients and the press by C.I.T. Corp., the country's largest industrial financing firm. C.I.T. Corp. is a subsidiary of C.I.T. Financial Corp., accounting for about 10 pct of the parent firm's annual volume.

Offer Longer Terms

Purchasers using the new financing plan will be able to pay for new machinery at substantially the same rate it can be depreciated. Previous financing programs have been based on a series of equal installments, usually over a much shorter period of time.

Under the new program, C.I.T. has stretched out its terms to match more nearly the useful lives of the eligible equipment. It now offers six-year terms on construction equipment (previously 3 years), 10 years on machine tools (previously 5 years), 6 years on gasoline lift trucks and 8 years on electric lift trucks (previously about 3 years on both).

Match Fastest Schedule

Normal down payments still apply. The finance charge will be 4.25 pct multiplied by the number of years of the contract times the original unpaid balance.

C.I.T. president Sidney D. Maddock said the "revolutionary"

financing plan is set up to work with the fastest schedule permitted under the new tax law—the "sum of the digits" method of depreciation. Under this schedule 73 pct of depreciable cost of a machine with a useful life of 10 years can be written off in the first 5 years. C.I.T. studies indicate this method will be the one most used by industry.

"Sum of the digits" method of depreciation works like this: On a machine with a useful life of 6 years, the digits 1, 2, 3, 4, 5 and 6 would be added for a total of 21. Then the digits would be inverted, and in the first year 6/21 of the cost would be charged to depreciation expense; the second year, 5/21; the third year, 4/21, and so on until in the last year, 1/21 would be written off.

Charge 52 Pct to Taxes

Since payments under the new C.I.T. financing program are graduated to match the depreciation schedule, they can all be written off as depreciation expense each year.

Mr. Maddock offered the fol-

lowing as an example of the tool-buying incentive furnished by the C.I.T. plan:

"A firm in the 52 pct federal income tax bracket using the C.I.T. plan would have had to pay additional taxes amounting to 52 pct of its tool payments if it had not bought the tool, leaving only 48 pct of its tool payment to be taken out of retained earnings."

C.I.T. will make the new financing plan available through builders or distributors, or direct to buyers.

The firm was organized in 1908, has been in industrial financing about 30 years. It financed about \$160 million of industrial equipment last year, and it expects the new plan to raise the volume sharply this year, based on enthusiastic reports of initial client reaction.

How It Works

Payments under the "pay-as-you-depreciate" plan usually will be made monthly. A buyer of a \$40,000 machine, sold on a six-year contract, would determine

How Payments Are Scheduled

Percentage of unpaid face of paper (unpaid cash balance plus finance charge) which is payable each month.

Payable Monthly In	3-Year Term Pct	4-Year Term Pct	5-Year Term Pct	6-Year Term Pct	7-Year Term Pct	8-Year Term Pct	9-Year Term Pct	10-Year Term Pct
1st Year	4.20	3.40	2.80	2.40	2.10	1.90	1.70	1.50
2nd Year	2.80	2.50	2.20	2.00	1.80	1.70	1.50	1.40
3rd Year	1.33	1.60	1.70	1.60	1.50	1.40	1.30	1.20
4th Year		0.83	1.10	1.20	1.20	1.10	1.10	1.10
5th Year			0.53	0.80	0.90	0.90	0.90	1.00
6th Year				0.33	0.60	0.70	0.70	0.80
7th Year					0.23	0.40	0.50	0.50
8th Year						0.23	0.40	0.40
9th Year							0.23	0.30
10th Year								0.13



Licensed manufacturers of recessed head screws who have specified "Special Processed" wire for their difficult cold heading jobs find that it more than pays for itself by: (1) increasing the production rate which *lowers the cost per unit*; (2) greatly prolong die life which *reduces machine down-time and labor costs*; (3) providing a higher quality finished product which *minimizes rejections and inspections*.

The excellent flow properties of this superior cold heading wire, together with its structural soundness, enables you to gain greater efficiency from start to finish on the more intricate and precise cold heading parts in your production schedule.

For further information, see your Keystone representative or write direct.



FINANCIAL

his payments in the following manner:

Cost of equipment	\$40,000
Purchaser's initial payment	\$10,000
Unpaid balance	\$30,000
Finance charge (4.25 pct x 6 x \$30,000)	\$ 7,650
Purchaser's obligation (unpaid face of paper)	\$37,650
Monthly payments due against the obligation will be indicated on the contract (see table) as a per- centage of the unpaid face of the paper.	

Home Building Strong

Excellent business conditions in the home construction field will continue past the end of this year and well into 1955.

With consumer buying power staying high, says Ewan Clague, special assistant to U. S. Labor Secretary Mitchell, the demand for new homes will hold up well.

He visualizes increasing pressure on the housing supply by veterans. With about 5 million more ex-servicemen expected to take advantage of GI home-loan opportunities before their rights expire, a large percentage may buy new houses before 1957.

Keep Back Pay Record

Employers are now required to keep records of back-wage payments made to employees to meet federal minimum wages if the payments are made under the Wage and Hour Administration.

The new requirement provides that employers are to record the amount paid to each employee, the period covered, and the date of payment. These figures must also be reported on a special receipt form provided by the government.



Prizes:

Metalworking students high in Industrial Arts Awards.

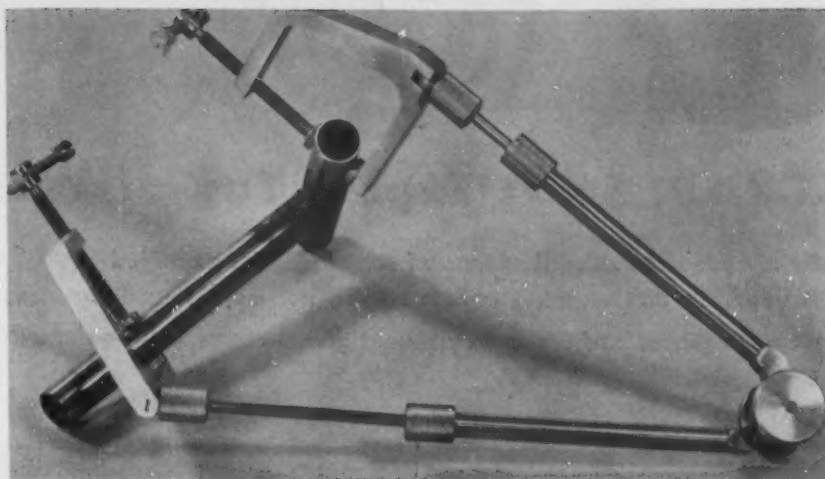
Youthful metalworkers, whose skill and craftsmanship may play a major part in industry in years to come, stood out among the top winners in Ford Motor Co.'s 1954 Industrial Arts Awards competition.

This year's program attracted more than 20,000 projects in 13 general divisions. The divisions are: wrought metal, patternmaking and molding, machine shop, plastics, electrical, mechanical drawing, architectural drawing, printing, ceramics, jewelry, leather, model and open. All entries were class projects under supervision of instructors.

Awards totaling \$50,000 ranged from \$20 to outstanding achievement awards, which included expense paid trips to Dearborn and Detroit. Thirty-one youngsters made the trip this year, including 30 IAA outstanding achievement award winners and one more whose project in the machine shop division won a special ingenuity award.

"The program strives to encourage pride of craftsmanship and creative imagination among students enrolled in junior, senior and vocational high schools," explained Dewey F. Barich, manager of Ford's educational relations department. "Judges and IAA officials this year noted continuing improvement in the quality of projects. Better craftsmanship was evident as a demonstration of greater originality and ingenuity."

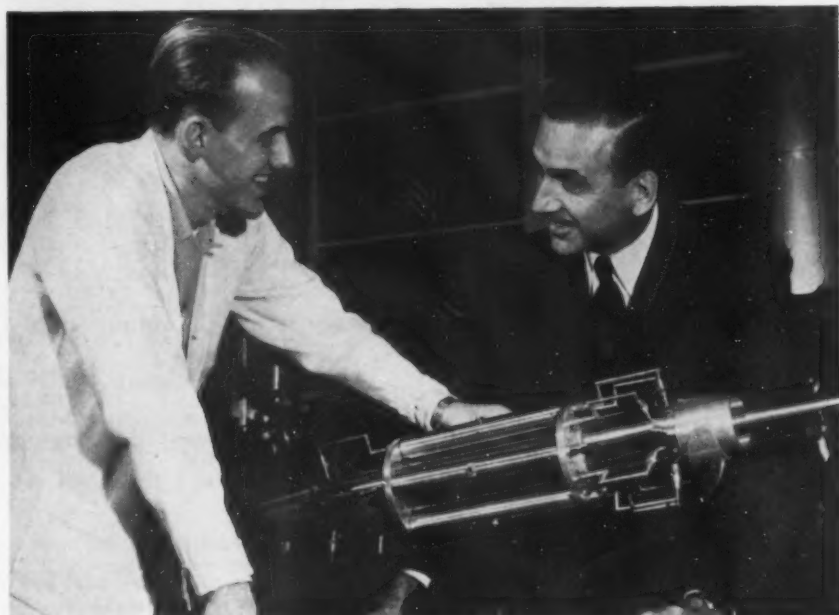
Of the 712 cash awards given in 1954, California topped the list with 162, including 13 of the top outstanding achievement awards. Students from every state and territory were represented in the finals. Of the thousands of projects entered, 5039 were sent to Dearborn for the national judging finals. A panel of 30 leading industrial educators and industrialists evaluated the entries.



VERSATILE clamp won special award for Don Lloyd, 16, of Orange, N. J.



DON ELLIOTT shows cast plaque to vice-president William Clay Ford.



MODEL JET engine won for Pittsburgh's Baylor Spratt, 19. Here it's admired by Dewey F. Barich, manager of educational relations department.

SCRAP: Start Export Tug-of-War

Officials predict 1.2 million tons of scrap may be exported this year . . . BDSA studies effects . . . Dealer-consumers differences may end in fight over quotas and when they should go on—By N. R. Regeimbal.

♦ GOVERNMENT defense officials and scrap users and dealers are taking a close look at the impact of booming scrap exports on this country's national resources position in a future emergency.

Results of the studies will be brought before a task group of the Business and Defense Services Administration on Nov. 3. The task group was organized in January to keep tabs on iron and steel scrap exports. Meeting could be explosive.

At a meeting of the task force a week ago, William Kerber of Republic Steel Corp., director of the Iron and Steel Div., asked the users and dealers to determine what effect the mounting scrap exports are having on the steel industry now and what they might be in the future. He also asked for suggestions for curbing whatever detrimental effects are involved.

Licenses Zoom

Government officials are also attempting to discover what the real scrap needs of foreign steel producers are, to determine if they are stockpiling scrap or if some other trend is indicated.

Figures from the Commerce Dept. clearly show what's causing the concern. Tonnage of export licenses dipped slightly in the first quarter of this year below the previous 3 months, then began a steady, almost spectacular rise throughout the remainder of this year. In the first quarter of 1954, licenses to ship 176,000 tons of iron and steel scrap were issued. Amount jumped to 353,000 tons in the second quarter; to 755,000 tons in the third quarter and amounted to 212,000 tons in the first 2 weeks of October.

A more realistic indication of trend is evidenced in actual scrap shipments, which lag behind the tonnages approved in licenses because the permits are good for 6 months.

May Ship 1,200,000 Tons

Shipments, which in the final quarter of 1953 totaled 99,000 tons, increased to 200,000 tons in the first quarter of this year, then lagged to 182,000 tons in the second quarter. In the third quarter, following removal of all export controls, shipments climbed to 217,000 tons. Although no official figures are available for the first

2 weeks of the final quarter, one source indicates shipments may have totaled close to 180,000 tons in that short period.

Shipments for the first three quarters of the year totaled 699,040 tons, which indicates that exports may go as high as 1.2 million tons, officials predict. This would be the highest year since before World War II.

Principal users of exported scrap, Commerce Dept. says, have been Spain, Austria, the United Kingdom, Japan, Belgium, West Germany, Italy, and Yugoslavia. Japan's purchasing activities, however, have not come up to ex-

Table I—Scrap Licenses, Exports, Imports—1954

Country	1 Q '54		2 Q '54		3 Q '54		4 Q '54
	Licensed	Exported	Licensed	Exported	Licensed	Exported (July-Aug.)	Licensed to 10/20
Canada.....	NLR	7,639	NLR	16,620	NLR	2,032	NLR
Mexico.....	72,491	47,373	75,269	46,729	67,631	48,621	812
Argentina.....			49,210			19,132	71,000 ¹
Japan.....	94,046	135,422	83,444	85,377	77,870	24,863	1,190
Formosa.....			7,381		9,298		
Philippines.....			10		20	8	
United Kingdom.....			22,500		100,400	35,482	1,000
West Germany.....			8,953	8,873	194,978	9,978	88,792
Netherlands.....					9,940		9,940
Belgium.....			11,814		9,940	11,814	
France.....					9,350		
Italy.....					140,212	9,389	60,000
Spain.....			46,375 ³		70,142 ³	27,398	
Yugoslavia.....	9,009 ⁴	9,206	29,839 ⁴	19,637	28,350 ⁴	9,242	
Austria.....			15,350		30,509	19,654	
Norway.....			3,150	2,907 ⁵			
Sweden.....					5,093		
Other (Customs estimates—GLV shipments).....		536		1,428		500	
GROSS TOTAL.....	175,551	200,177	353,304	182,510⁶	754,732	216,914	212,004
Ex. Canada, or gross licensed exports.....		192,637		165,590		214,882	
Imports were.....		4,062		25,303		45,964	
Leaving net licensed exports of.....		188,475		140,287		168,918	
Of this, off-shore tonnage was.....		23,971		6,958		360	
Leaving net licensed exports of Continental U. S. origin of.....		164,496		129,681		168,618	

NLR—No license required.

¹ One year's military requirements.

² "Distress" scrap from Puerto Rico licensed in 2 Q '53.

³ Of this total of 118,517 tons, 112,069 tons were under FOA procurement.

⁴ Of this total of 67,198 tons, 55,573 tons were under FOA procurement.

⁵ Borings, shovellings and turnings to Norway were of Canadian origin.

⁶ Total adjusted to exclude tonnage to Norway and 741 tons of misdeclared material to India.

Prepared by Steel Section, Materials Div., Office of Export Supply, Bureau of Foreign Commerce.

pectations because of a dollar shortage there, officials say.

See Tug-of-War

Mr. Kerber termed last week's meeting of the task group "amicable." One scrap dealer agreed, but added that it was only because price, "the real meat of the problem," was not discussed.

Observers believe it is a definite probability that the task group will be asked to consider imposition of a quota on exports of iron and steel scrap as a means of checking the trend. A tug-of-war between the steel company representatives and the scrap dealers will probably develop over what the quota should be. But the explosion is expected when the group discusses when it should be placed in effect.

Claim Surplus Exists

One member of the task force told THE IRON AGE that he expects a move to have a quota imposed immediately on the grounds that scrap is a natural resource which must be preserved in this country. The scrap dealers, however, are

said to be arguing that Mobilization Day for such a quota should be the day when full mobilization goes into effect.

Other arguments the scrap dealers are preparing are that there is a surplus of scrap generated, even in times of full steel production; that there is no use in restricting exports of scrap unless exports of iron ore, steel, and pig iron are also curtailed, and that the whole discussion is caused by the rising cost of scrap to domestic steel mills as a result of the increased demand for export scrap.

Prices Up \$10

A southern scrap dealer said recently that mills in that area had been buying scrap that they had turned down 60 days earlier when the price was \$10 a ton cheaper. He noted that those mills have 2 or 3 months' supplies of scrap in their own yards.

Commerce Dept. could put a quota on exports by re-invoking its privileges of denying export licenses after a certain total has been reached on the grounds that

"national security" would be adversely affected.

Boost Exploration

Forty-two applications for government financial aid to explore and develop mineral deposits were received by the Defense Minerals Exploration Administration in September. It is the largest number in any one month for more than a year.

Total value of the projects is \$475,000, of which the government is asked to put up \$330,000.

During the July-September quarter, 101 applications for aid in \$5 million worth of exploration were received from firms seeking to develop 15 minerals. Largest of these applications was for a \$393,000 uranium project in Utah. For the 3 months, 22 contracts for exploration were signed for \$500,000 worth of work.

A score of projects started earlier were certified as resulting in discoveries during the quarter. Included was the first successful columbium-tantalum project in the exploration program.

Table II—Scrap Exports by Customs Districts

Customs District	(Gross Tons)		
	1 Q '54	2 Q '54	July/August
Maine.....			13,348
Massachusetts.....	541	1,900	8,586
Rhode Island.....	5,012		6,305
New York.....	13,691	22,635	74,097
Philadelphia.....		10	12,620
Maryland.....			3
Virginia.....	3,925	16,858	
Florida.....	17,776		
South Carolina.....			8,040
Georgia.....			8,707
Alabama.....			5,357
New Orleans.....	9,910	20	
Texas.....		207	
Los Angeles.....	27,757	40,546	13,027
San Francisco.....	27,082	22,012	8,339
Oregon.....	393	275	
Washington State.....	5,344	2,777	2,997
	110,717	107,239	161,748
Hawaii.....	16,971	5,608	300
Puerto Rico.....	7,000	1,350	
	23,971	6,958	300

Note: Exports to Canada and Mexico are excluded because they are shipped almost entirely across land borders. Shipments of "Other" scrap (see Table I) are also excluded since no port is specified by Census.

Prepared by Steel Section, Materials Div., Office of Export Supply, Bureau of Foreign Commerce.

May Blacklist Mines

Hazardous conditions reportedly found in mines of eight small Tennessee coal companies may lead to the placing of the firms' names on a government blacklist, under provisions of the Walsh-Healey Act.

If this action is taken, no government agency may award a contract to the firm for 3 years unless the ban is lifted.

The official who may blacklist the coal companies is U. S. Labor Secretary Mitchell. A Labor Dept. hearing examiner, after hearing mine inspectors testify that they had found a number of unsafe conditions in the mines while coal was being dug for the government, recommends this action to Mr. Mitchell.

A series of investigations by federal mine inspectors early this year resulted in two complaints against the firms, signed by Secretary Mitchell.

Because each mine employs fewer than 15 persons, use of the Walsh-Healey Act was invoked as the basis for the Labor Dept. action.

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SLEEVE BEARING HEADQUARTERS SINCE 1901

Atoms:

**AEC plans power stations,
lets many contracts.**

Atomic energy was again making headlines in the midwest last week. Argonne National Laboratory at Chicago, had announced that plans were complete for building of an atomic reactor (to be completed in 1956), that would supply 5000 kw per hr, to fill the laboratory's own electrical needs.

Early reports that the reactor, when not in use by Argonne during the night hours, would feed electric current into the power lines of Commonwealth Edison, cannot be confirmed. Commonwealth is the Chicago utility from which Argonne currently purchases its electric power. Argonne spokesmen indicated that no power-selling proposal has been made to Commonwealth at this time.

Nonetheless, the Argonne light-water reactor, though not expected to produce electricity at a cost competitive with coal, will probably be the first power-producing pile in operation outside the AEC's pilot operation at Arco, Idaho.

Plan Six Reactors

Pittsburgh's 60,000 kw Duquesne Light Co.-Westinghouse reactor will not begin producing current for at least 3-5 years. Though five other reactors will be built by the AEC, the radical, light-water reactor at Chicago will be the first power producer of this size to get into operation.

The 5000 kwh reactor, producing 6660 hp, will be constructed by Argonne, with Allis-Chalmers building the electrical equipment.

The stir over the possibility of atom-produced electric power coming into Chicago power lines by 1956 came hard on the heels of the Machinery & Allied Products Institute's analysis of industrial participation in atomic energy development. MAPI points out that AEC business is already big business—18,000 prime contracts were let by the agency last year, and more than 5000 U. S. firms have to date held AEC prime contracts.

FASTENERS: Point to Industry Upturn

The bellwether fastener industry is pointing toward a climb in industrial activity . . . After a poor summer, sales are climbing . . . Packaging standards are expected to help the industry—By T. M. Rohan.

♦ INDUSTRIAL fasteners, one of the bellwethers of industry, are currently enjoying a lively upsurge and getting stronger by the week.

Major bright spots are the automotive industry, heavy construction work, very low jobber inventories and increased use of mine roof bolts. Biggest hole in the dike is the railroad industry which has virtually completed track laying for the year and reportedly will purchase no more track supplies in 1954.

One major supplier of rods and bolts indicated orders from the cold heading industry for the fourth quarter are up 35 pct over the first and third and 20 pct over the second when strike and price hedge buying boosted intake. October is well on the way toward being the biggest sales month since June. Deliveries have gone from 2 to 4 weeks. This producer is also fearful of a "run" caused by extended deliveries, resulting in later cancellations.

Gains Stand Out

Another major supplier, however, indicated "no major upsurge, although there is a healthier feeling all around."

Although there are no recent overall sales figures available on activity in the \$500 million annual fastener industry, members of the Industrial Fasteners Institute, representing the bulk of independent producers, almost without exception reported rise in sales.

"We are feeling a good upsurge now and expect it will continue through 1955," according to Paul Horst of Townsend Co., New Brighton, Pa. "There are some indications welding has passed its peak, particularly in bonding on auto and railroad wheels and

brakes. We have experienced a definite trend toward riveting when a superior job is required."

Auto Orders Pick Up

High tensile strength bolts, replacing riveting in heavy construction work, are catching on fast, especially for big buildings, according to Donn Greenshields, executive vice president of National Screw and Mfg. Co., Cleveland. More and more construction firms are starting to use them because of labor savings and elimination of nuisance noise from riveting in populated areas, he said.

Automotive orders have picked up to last year's levels and the immediate outlook for this season is even better, according to Robert Patterson, sales vice president at Lamson and Sessions, Cleveland. By the end of the year all heaviness in inventories will have been washed out completely, he said. As a result, delivery requests are

getting more and more on a spot basis. He said proposed major highway construction should go a long way toward improving fastener markets in earthmoving equipment, trucks, construction equipment and machine tools.

Total fastener industry shipments dipped no more than 25 pct and orders not more than 10 pct, according to Harry McCully, vice president, Russell, Birdsall and Ward Bolt and Nut Co., Port Chester, N. Y. Inventories are being chewed up fast and all sluggishness has been dissipated, he added. There has been a noticeable betterment in the last month and the firm is optimistic for a reasonable improvement through 1955.

Standardize Packages

October orders for nuts and bolts in Ohio are running 10-12 pct over September for one major producer with railroads being only lagging market, especially on



JUMBO new plano-miller at Dominion Bridge Co., Ltd., Lachine, Que., can hold three standard cars in line on table. Main column weighs 48 tons, cross arm, 35 tons, and the 50-ft long travelling work table, 35 tons. Built in England by Kendall & Gent, the machine took 2 years to make.



A Tight Squeeze

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Secret behind one of the cleverest containment jobs we know of, is a rubber thread used in making women's girdles, men's socks, suspenders, and many other products. This thread is made by slitting thin sheets of rubber into tiny elastic strips. How to do it poses an interesting engineering problem.

Taft-Peirce engineers helped to design and build several special machines that do the job. Slit the sheets into many fine threads . . . each one exactly the proper size . . . and keep them free from tangling or sticking together. The result — the company that ordered these machines now has less shutdowns, less rejects . . . makes a more uniform product at lower cost.

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TELEPHONE, WOONSOCKET 1

rail bolts and supplies. Trend toward high strength bolts rather than rivets is more than made up for dollarwise in higher cost of bolts and nuts. Heavy inroads of welding in large construction have also been noted. King size roof bolts used in underground mine supports in place of timbers are also increasing in popularity.

One of the major strides in industrial fasteners—a seven-year standardization project on packaging by the Industrial Fasteners Institute—is also finally coming into fruition. After 7 years of haggling and compromising with customers, a hodge-podge of 214 unduplicated sizes of cases have been reduced to three. These were adopted at the Institute's last quarterly meeting and are being forwarded to the Department of Commerce as recommended practice.

Use Fewer Sizes

The largest new size case is a No. 40 holding 180 lbs. This is made up of two No. 20s holding 90 lbs each and these in turn hold two No. 10 boxes holding 45 lbs each. A great number of sizes were also reduced to 12. Previously shipping cases contained as high as 270 lbs of material.

The 80 members of the Institute representing the bulk of the industry are currently working down their inventory of previous sized cartons and ordering the new sizes for future use. The move is expected to greatly improve stacking, inventory control, materials handling and shipping.

GE Opens Plant

Completion of General Electric Co.'s Welding Dept. expansion was accomplished last week with the formal opening of its welding equipment plant at York, Pa.

"The new facilities at York make possible the complete integration of Welding Dept. equipment manufacturing operations, including standardization of products and mechanization of many manufacturing procedures," stated R. C. Freeman, general manager.

FREIGHT: Ford Ends 'Phantom' Rates

New policy for all Ford divisions cuts delivery charges to dealers beyond 1000-mile radius . . . Will aid West Coast sales, curb bootlegging . . . Surprised industry will follow suit.

♦ A NEW FREIGHT rate policy announced by the Ford Motor Co. last week may mean the end of phantom rates to auto buyers in areas more than 1000 miles from Detroit.

Automotive price practice for years has been to charge full freight from main plant to a dealer in Los Angeles, for example, even though cars may have been assembled within the city limits.

Ford's new policy came as a surprise in Detroit, announced decreases in the distribution and delivery charges on all cars and trucks delivered to dealers beyond a 1000-mile radius of Dearborn. Amount of decreases vary from point to point, depending on distance.

Change Wholesale Prices

At the same time, Ford announced slight increases on wholesale prices. These were offset in the more distant points to result in net reductions to dealers outside the 1000-mile radius. Close at hand, it will mean higher prices, resulting in a redistribution of freight costs, in effect.

The new policy will directly affect General Motors, with 11 Chevrolet assembly plants and seven Buick, Olds, Pontiac assembly plants around the country. Chrysler has one West Coast assembly operation and another at Evansville, Ind. American Motors has one assembly plant at El Segundo, Cal.

The rate of change for Lincoln and Mercury will be correspondingly higher. The net reduction for a Lincoln delivered to Los Angeles will be \$104 and \$91.50 for a Mercury. All figures apply to 1954 prices as 1955 prices have not yet been established.

As appears obvious from the table, West Coast customers will be the principal beneficiaries. Freight rates have been so high that taking delivery in Detroit by West Coast customers had grown substantially. This factor, however, had comparatively little significance in changing the policy.

The cost to assemble a car in a far distant plant is considerably higher than the cost closer to the point of manufacture of basic parts and components. These still have to be shipped to assembly plants, but freight costs are much less than on a completed car, which the dealer formerly paid, then passed on to customers.

Improve Distant Markets

Charging the phantom freight had a bad general effect and could have led to new legislation. In fact, one bill to curb charging more than actual freight was introduced to Congress in the past session.

Immediate effect to Ford should be a better market in geographical areas far from Dearborn. This alone should put others in the

position of having to revise their own freight policies. Another effect of much interest to the auto industry, should be a decrease in "bootlegging," which has thrived on the phantom freight policy.

Sets Altitude Record

Suitability of helicopters for operation at moderately high levels is shown in the setting of a new altitude record of 24,500 ft by an Army aviator. This unofficial record was established recently by WO B. I. Wester in a new Sikorsky XH-39, a three-passenger utility aircraft.

Officials of the National Aeronautic Assn. instrumented and supervised the flight.

Previous record for helicopters was 22,110 ft.

Gets Truck Contract

Reo Motors, Inc., Lansing, Mich., has a new contract amounting to \$984,000 for production of 2½-ton trucks for the Army which supplements an existing truck order placed with Reo by the Army.

Firm has been producing the 2½-ton military model since '50.

What Ford Saves Dealers on Freight

Change in distribution and delivery charges to dealers for a Ford Custom-line V-8 sedan at representative points across the country.

City	Reduction	Wholesale Price Increase	Net Change
Salt Lake City	\$ 55.50	\$13.50	—\$42.00
Denver	16.50	13.50	— 3.00
Los Angeles	101.00	13.50	— 87.50
San Francisco	101.00	13.50	— 87.50
Miami	20.50	13.50	— 7.00
Houston	13.50	13.50	0
New York	—	13.50	+ 13.50
Chicago	—	13.50	+ 13.50
Dearborn	—	13.50	+ 13.50

Ships:

Navy orders new ships . . . Lets design contracts.

Two escort vessels (DE) will be built for the Navy at a fixed price of \$14.9 million by the Puget Sound Bridge and Dredging Co., Seattle.

The contracting firm was the low bidder in competition for this order. Only West Coast companies were invited to offer quotations on the work.

The Puget Sound firm is completing an inshore fire support ship (IFS) for the Navy. Its new order prevents a possible curtailment of building operations at the shipyard.

Prepare Plans

Working plans for a prototype general stores issue ship are to be prepared for the Navy by the Quincy, Mass., shipyard of Bethlehem Steel Co.

Several thousand man-days of work will be required to accomplish this work.

The new vessel will be part of a family of larger, faster ships being built to replenish operational forces at sea. Its hull and machinery characteristics will be generally like those of ammunition and refrigerated-cargo ships now under construction.

Full load displacement of this new ship will be about 15,000 tons. Complete length will be about 500 ft, and the beam measurement will be approximately 72 ft.

Convert Cargo Ship

Equipment will include modern gear for transferring stores at sea. A single-screw marine engine will power the ship.

Drafting of working plans and other design data needed in conversion of a Navy attack cargo ship (AKA) to a cable laying ship (ARC) will be handled by the Key Highway Shipyard of Bethlehem Steel Co., which is located in Baltimore.

Navy officials say the Baltimore

yard was selected for this new project because of its prior experience in preparing plans for similar work and because it has the design skills and facilities needed to handle the ship conversion assignment efficiently.

Ready New Target

Guided missiles will be tested economically by the Navy through use of a new parachute target as a substitute for drone aircraft.

This rocket-carried device, developed for the Navy by New Mexico College of Agriculture and Mechanical Arts, can be used at high altitudes, unlike the relatively expensive drones.

Resembles Aircraft

Known as "Pogo," the parachute, 20 ft in diameter, is packed into the nose of a 13½-ft rocket. The rocket is fired vertically from a portable

launcher to the desired altitude.

A strong spring ejects the parachute from the rocket.

A thin layer of metallic silver coats the parachute silk. At high altitudes, the target resembles an aircraft when sighted on the radar screen. It may be fired at by more than one missile as it floats down.

Contracts Reported

Including description, quantity, dollar values, contractor and address. Italics indicate small business representative.

Gas turbine compressors, 203, \$1,877,822, The Garrett Corp. (AirResearch Mfg. Co.), Los Angeles, Calif. *James B. Meyer*.
Oxygen regulator parts, 2305, \$633,532, Bendix Aviation Corp., Eclips-Pioneer Div., Teterboro, N. J. *F. A. Battel*.
Acft. spare parts, \$2,800,000, General Dynamics Corp., Convair Div., San Diego, Calif.

B-52D airplanes, sp pts, \$83,000,000, Boeing Airplane Co., Wichita, Kan.

J57-F-13, turbojet engines, 60 ea, \$22,208,200, AFCT Eng. Div., Ford Motor Co., Chicago, Ill.

Airplanes, sp pts, \$30,000,000, Lockheed Acft. Corp., Marietta, Ga.

STEEL: What Mills Shipped in August

As Reported to the American Iron and Steel Institute

STEEL PRODUCTS	AUGUST					YEAR TO DATE				
	Carbon	Alloy	Stainless	Total	Pct of Total Shipments	Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingot...	13,131	8,099	1,518	22,748	0.5	127,193	89,620	12,407	229,220	0.5
Blooms, slabs, billets, tube rounds, sheet bars, etc.	94,752	23,212	1,581	119,545	2.6	749,498	211,897	9,059	970,444	2.3
Skelp	10,934			10,934	0.2	79,274			79,274	0.2
Wire rods	63,939	574	424	64,937	1.4	495,220	8,553	2,944	506,717	1.2
Structural shapes (heavy)	323,149	2,625	3	325,777	7.0	3,114,447	18,196	89	3,132,732	7.4
Steel piling	40,324			40,324	0.9	264,966			264,966	0.6
Plates	346,193	17,205	1,331	364,729	7.8	3,536,234	150,191	11,028	3,697,453	8.7
Rails—standard	63,296			63,296	1.3	924,214	112		924,326	2.2
Rails—all other	7,546			7,546	0.2	61,345			61,345	0.1
Joint bars	2,204			2,204		94,852			94,852	0.2
Tie plates	13,531			13,531	0.3	197,596			197,596	0.5
Track spikes	4,065			4,065	0.1	53,250			53,250	0.1
Wheels	13,130	16		13,146	0.3	133,563	857		134,420	0.3
Axles	4,314	4		4,318	0.1	40,687	125		40,812	0.1
Bars—hot-rolled	356,175	67,780	2,247	446,202	9.5	3,155,541	680,504	22,951	4,068,996	9.6
Bars—reinforcing	152,286			152,286	3.3	1,187,332			1,187,332	2.8
Bars—cold-finished	73,346	12,459	3,154	88,959	1.9	644,824	112,041	24,638	781,501	1.8
Total steel	968	5,507		6,475	0.1	8,676	47,909		56,585	0.1
Standard pipe	209,456	140		209,596	4.5	1,537,092	300	5	1,537,397	3.6
Oil country goods	170,476	33,217		203,693	4.4	1,416,866	207,342		1,624,208	3.8
Line pipe	231,751			231,751	4.9	1,943,809	16		1,943,825	4.6
Mechanical tubing	32,753	13,555	304	46,612	1.0	330,924	113,560	2,594	447,160	1.0
Pressure tubing	17,291	4,253	1,500	23,044	0.5	149,409	33,026	12,137	194,572	0.5
Wire—drawn	193,418	1,448	1,489	196,355	4.2	1,536,594	19,902	12,001	1,568,497	3.7
Wire—nails, staples	53,224			53,224	1.1	268,032		2	268,034	0.6
Wire—barbed, twisted	9,317			9,317	0.2	106,014			106,014	0.3
Wire—woven wire fence	22,780			22,780	0.5	232,572			232,572	0.6
Wire—bale ties	4,213			4,213	0.1	42,951			42,951	0.1
Blackplate	53,492			53,492	1.1	455,585			455,585	1.1
Tin & terneplate—hot dipped	113,747			113,747	2.4	939,677			939,677	2.2
Tinplate—electrolytic	227,853			227,853	4.9	2,663,943			2,663,943	6.3
Sheets—hot-rolled	402,484	10,186	1,030	413,700	8.8	3,734,962	122,346	8,262	3,865,570	9.1
Sheets—cold-rolled	633,489	3,582	8,661	645,702	13.8	5,998,884	29,417	61,272	6,089,573	14.4
Sheets—galvanized	207,113			207,113	4.4	1,542,269	349		1,542,618	3.6
Sheets—all other coated	12,825			12,825	0.3	112,882			112,882	0.3
Sheets—enameling	11,355			11,355	0.2	109,625			109,625	0.3
Electrical sheets & strip	4,640	35,655		40,295	0.9	89,553	329,910		389,463	0.9
Strip—hot-rolled	106,287	1,620	757	108,664	2.3	924,513	17,226	2,447	944,186	2.2
Strip—cold-rolled	82,039	870	11,978	94,887	2.0	703,652	7,721	104,357	815,730	1.9
TOTAL SHIPMENTS (1954)	4,383,268	261,977	35,977	4,681,242	100.0	39,758,500	2,401,190	286,261	42,445,951	100.0
TOTAL—PRIOR YEAR (1953)	5,945,464	502,110	51,031	6,498,605		50,704,209	4,295,616	433,157	55,432,982	

Report To Management

It makes incredible reading—month after month you see reports about new records being set by the construction industry. Most recent figures show that spending for new construction in the third quarter hit an all time high of \$10.75 billion, 7 pct more than for same period last year.

Seasonally adjusted, new construction in the third quarter was moving at an annual rate of \$37.5 billion, topping both the \$36.3 billion per year pace established in the first half of the year and actual '53 outlays of \$35.3 billion. In September alone, new construction amounted to \$3.6 billion, matching the record set the previous month.

Private residential building is the stickout item in this feverish construction activity. In the first 9 months of the year it accounted for 34.7 pct (\$9.5 billion) of total construction expenditures (\$27.4 billion) for that period.

You've probably seen the forecasts of the pessimists who say the housing boom is due to rupture. Their main argument is the decline in the formation of families due to the low birth-rate of depression years. But you can write this off as bunk. The housing boom will continue.

What makes this certain is:

- (1) U. S. population is growing at the rate of one person every 12 seconds.
- (2) There's a trend away from doubled-up families. Between 1940 and 1950, the number of people per household dropped from an average of 3.8 to 3.4.
- (3) Because of the high birth rate, many families who bought small houses in the postwar years are being forced to expand them or buy larger homes.
- (4) Higher wages are giving young people economic independence at an earlier age.
- (5) Shift of the U. S. population to the West and South and to the suburbs away from the farms is adding to the demand for more housing.

And add to these factors: stimulus of easy credit and the new government Housing Act.

There's no doubt the coming era of atomic power is going to cause some revolutionary changes. But the electric utility industry doesn't figure it means they'll be sluggish by a tremendous loss on their investment in turbines, generators, transformers and other pre-atom era equipment.

Reason: the utilities say atomic power plants will use much the same equipment as coal-fired steam plants. The uranium boiler will simply replace the coal boiler; generators and transformers will be the same as the type now used. Also, the demands for electric power in the next few decades will be so great that atomic power will only be a power supplement, not a replacement. It's estimated that in 1964 total amount of atomic power installed will be about 2 million kw—only 1.2 pct of total capacity expected by that time.

Generally depressed foundry industry

is showing surprising optimism about the '55 business outlook (as was first noted in THE IRON AGE, Oct. 7, 1954). In a recent survey of 100 foundrymen, 77 pct said they expect general business conditions to improve during the rest of this year and 57 pct believe '55 will be better than '54 (36 pct figured it would be about the same).

On the foundry outlook for '55

50 pct think it will be a "fair" year; 47 pct expect it to be "good."

In case you missed it: England's top-flight

historian Arnold Toynbee predicted recently that there will not be a third world war. He also believes some form of world government will evolve, at least for control of atomic energy, and thinks the Soviet Union will develop a middle-class society similar to that of capitalist nations.

INDUSTRIAL BRIEFS

Elbow Room . . . Penn Metal Co., Inc., is enlarging its Parkersburg, W. Va., plant to provide additional storage space and improved loading and shipping facilities for its line of Lightsteel structural sections.

To Build . . . P. R. Mallory Co., Inc., Indianapolis, will build a plant at Huntsville, Ala., to manufacture precision components for electronics and metallurgical industries. Ground will be broken Nov. 1 on a 21-acre tract.

Stock Dividends . . . Trane Co., La Crosse, Wis., declared a 100 pct stock dividend. Nine months sales were up 11.5 pct and net profit was up 70.2 pct from the comparable period of 1953.

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Memphis Plant . . . Laclede Steel Co. formally opened its new Memphis plant earlier this month. The plant's location on the Wolf River in the northern industrial district of Memphis will permit truck and rail service on steel shipments to Kentucky, Tennessee, Arkansas and the northern sections of the Gulf States, east of the Mississippi River.

Arrangements Made . . . Bohn Aluminum & Brass Corp., Detroit, made arrangements with F. H. Langsenkamp Co., Indianapolis, to handle Bohn free-cutting brass rod in the greater Indianapolis area.

Gets Contract . . . Temco Aircraft Corp., Dallas, was awarded an Air Force contract to overhaul 87 Curtiss C-46 transport aircraft.

Nearly Ready . . . Lynchburg Foundry Co., Lynchburg, Va., reports that its new \$1.25 million addition for the manufacture of shell molded castings is nearing completion.

Team Study . . . Aluminum Co. of America's Research Laboratory will have a team of experts study porcelain enamel on aluminum. This group will deal with both fundamental research and the practical and economic problems connected with this field.

Well Deserved . . . Alfred P. Sloan, Jr., chairman of the board of General Motors Corp., was selected as the 1954 recipient of the Hoover Medal, one of the highest awards in the engineering profession. The medal was presented at the annual dinner of the American Institute of Consulting Engineers on Oct. 19.

Change Made . . . Sprague Engineering Corp. is the new name of the former Sprague Engineering & Sales Corp.

Office Opened . . . Guibert Steel Co. has opened a new sales and engineering office at 15 E. 40th St., New York, Suite 1203. Gerald Paul will be in charge.

25-Year Club . . . Members of the Peter A. Frasse & Co., Inc., 25-Year Club gathered for their annual dinner at the New York Athletic Club earlier this month. The combined services of the 31 members of the group totaled 969 years.

Elected . . . American Gas Assn. elected H. N. Mallon, president of Dresser Industries, Inc., Dallas, a director of the Association at its annual convention in Atlantic City.

Assembly Plant . . . Rohr Aircraft Corp. will open a new assembly plant at Winder, Ga., within the next few months.

Dividend Declared . . . Continental Can Co., New York, declared a regular quarterly dividend of 75¢ per share on common stock payable Dec. 15.

Brazilian Company . . . Austin Co. has established a new Brazilian company, Companhia Austin-Engenheiros e Construtores with headquarters in Sao Paulo. Cyril F. Prideaux is president of the new company.

Hear Ye . . . Phillips Corp., Pittsburgh, has stepped up production of its newly-developed heavy-duty trailers, capable of loads up to 250,000 lb.

Newly Formed . . . Canadian Electric Wire Ltd. has been formed to produce wire for wire weaving, electrical and other industrial fields and is expected to start production in early 1955.

New Project . . . Garrett Corp., Los Angeles, plans to spend \$400,000 on additions and improvements at its AiResearch plant at Phoenix, Ariz.



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October 28, 1954



Chevrolet, Pontiac Completely New

GM divisions feature lower, two-toned bodies, improved frames, suspension . . . Both have "hot" V8 engines, Chevy keeps six too . . . Executives predict top sales despite toughest competition—By R. D. Raddant.

◆ IN 1955 General Motors' two low-priced cars, Chevrolet and Pontiac, will wear the full impact of the corporation's efforts in complete model changes from top to bottom.

Changes will be carried even further than those in the 1954 Oldsmobile, Buick and Cadillac. The two smaller cars will not only have complete restyling, as did their higher-priced relatives, but will be powered by new V-8 engines as well. As a result, respective division heads are predicting winning sales years; Chevrolet for the entire industry, Pontiac in the medium-price field.

Styling and engineering changes of even one car, let alone two, are too numerous to be covered fully as they extend to all points: ride, performance, economy, appearance, interiors and just about everything else.

Face Hot Competition . . . But just as a word of caution they had to. Competition from cars yet to be revealed will be terrific. If Chevrolet and Pontiac do reach

their goals, they will earn it. The coming year will see more significant improvements in auto transportation than any since the war.

Although Chevrolet and Pontiac both share the same basic body, there is little more than conventional GM family resemblance. This results from the wrap-around windshield and a lower look, 2½ in. in the Chevrolet, 2¾ in. lower for the Pontiac. Glass area has been increased 26 pct in the Pontiac, 19 pct in the Chevrolet.

Sport Powerful V8's . . . The Pontiac V-8 will have 180 hp, Chevrolet's will have 162. Chevrolet will continue its time-tested six, but at an increased 136 hp. Pontiac has scrapped both in-line six and eight, will concentrate on the new V-8. Both divisions will stress performance and economy. Chevrolet will have overdrive. Particularly new will be Chevrolet's emphasis on the V-8's "hot" qualities, with more to be revealed later on.

Chevrolet will employ ball-joint

front suspension and has integrated its body and frame design to some degree with substantial reduction in vibration plus weight savings. It has minimized the "nose dive" on fast stops. Rear leaf springs are longer and mounted outside the frame to increase stability.

Pontiac has significantly improved its frame construction and overall suspension. Both cars have new steering mechanisms, both will have 12-volt electrical systems, rounding out the GM lines.

Tooling costs of the new cars will probably never be known, and one guess is as good as another. Chrysler recently set a \$250 million figure for its full model changes, but a multitude of factors make this inappropriate for a yardstick. Both divisions claim the new models represent the most complete changes in their history and challenge the entire auto industry to show more.

Have Two-Tone Styling . . . Externally, both Chevrolet and Pontiac have adapted the two-tone



1955 CHEVROLET Bel Air Sport Coupe, left, displays new body lines with GM's new two-tone styl-



ing. Pontiac's new Star Chief convertible, right, shares 180 hp V8 engine with other models.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 23, 1954.....	48,408*	14,472*
Oct. 16, 1954.....	46,253	13,258
Oct. 24, 1953.....	129,765	20,029
Oct. 17, 1953.....	127,821	24,922

*Estimated. Source: Ward's Reports

styling that was launched last year on Oldsmobile, with startling effects. Chevrolet's grille, much like the Corvette's, is something new in the industry. Both cars have been able to increase the size of interiors, particularly in width, in spite of the new emphasis on the low look.

The respective V-8 engines are widely different in makeup, except that they are both overhead valve, high-compression engines with "over-square" dimensions.

The Pontiac engine has 287.2 cu in. displacement with a bore of 3 3/4 in. and stroke of 3 1/4 in. Chevrolet's has a displacement of 265 cu in. with a bore of 3 3/4 in. and stroke of 3 in. Both have an 8 to 1 compression ratio. Engine fanatics will find fertile fields to explore in the powerplants.

Horsepower:

Loose test standards make for conflicting claims.

Chevrolet's announcement of 162 hp is just the beginning of a horsepower battle that is apt to go beyond the advertising stage.

A tipoff on the touchy situation is that all Chrysler divisions, perhaps some other makes, refused to state hp ratings in advance of new model announcement, even on an off-the-record, confidential basis.

Significance of this is that automakers fear that if word of new power rating leaks out too soon, there may still be time for competitors to make adjustments, or more probable, change advertised hp claims. Actually, there's little chance of either, but the implication is there.

Tests Are Flexible

Changes could be made since Society of Automotive Engineers' engine test code permits a great flexibility, states that "only parts essential for engine testing opera-

tions need be used. Accessories on the engine during test are to be listed." With this latitude, one company may announce a hp figure based on fewer power consuming accessories than a competing company.

This was brought out openly by E. N. Cole, Chevrolet's chief engineer, the man behind Chevrolet's new V-8. He stated that Chevrolet, in measuring its hp, used all accessories that are necessary to operate the engine, including such items as oil pump, water pump, fuel pump, and distributor.

"This horsepower thing," he said significantly, "has been kicked around too much."

It's only fair to point out that Chevrolet engineers don't have a monopoly on this feeling. Scarcely any automaker has escaped having its advertised hp questioned. Particularly early in a new model run, there is apt to be variation that can lead to distortion of the picture.

However, one car was accused of employing a radical cam early in the model run to obtain its advertised hp, then switching to a more moderate one for smoother performance but less power through-

AUTOMOTIVE NEWS

out the balance of the model year.

Mr. Cole's first public raising of the issue shows that mutterings over hp measurement, lurking beneath the surface in Detroit since hp race started, are apt to break out into the open one of these days. It's probably overdue that more specific standards of measurement be imposed.

Meanwhile, watch the hp claims, then look for some mid-season modifications this model year to create even more.

Price Thunderbirds

Price of Ford's Thunderbird has been established at \$2695, the suggested list price. The highly publicized and advertised "personal" car went on display last week.

This price includes the hardtop, 4-way power seat, dual exhaust, 4-barrel carburetor, tachometer, and electric clock. Optional items are the soft top, Fordomatic or overdrive transmissions, power steering, power brakes and power window lifts.

THE BULL OF THE WOODS

By J. R. Williams



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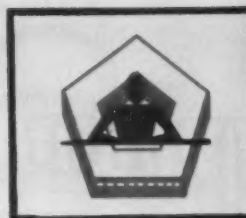
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THIS WEEK
IN
WASHINGTON

See Boost in Military Purchases

**Expect fadeout on Pentagon economy program in fiscal '56 . . .
Won't shoot works either unless hot war develops . . . Most items will go to
Europe, but some to Asia . . . Boost trade fairs—By G. H. Baker.**

◆ THIS YEAR'S \$2.5 billion dip in military buying probably will be the last cut-back for a while. By the beginning of the new fiscal year next July 1, the economy program that's been in effect around the Pentagon for the past year and a half will be fading fast.

"Shoot-the-works" spending for the Army-Navy-Air Force isn't the answer, either. What does lie ahead in the way of procurement philosophy is a gentle nudge forward in military buying that will spell total cash outlays to contractors of around \$20 billion annually.

Don't Expect War . . . Military planners base all these speculations on the assumption that a fighting war involving the U. S. is not imminent. Should hot war materialize, however, all these plans are automatically cancelled in favor of sharply juiced-up spending for arms.

Biggest items on the military shopping lists in the months ahead are to be construction, weapons, planes, and ships. Where will these items go? Most will be shipped to Europe, as in the past, but some areas of the Orient like the Philippines and South Korea are in line for hefty U. S. assistance. For example: Harold Stassen's Foreign Operations Administration is making \$700 million available for Korean aid—an increase of \$100 million over estimates agreed upon in the State Dept. only last January.

Research Paying Off . . . Five years of experimenting with

guided missiles is finally beginning to pay off. It is now openly predicted around the Pentagon that guided missiles probably will reach the inter-continental stage within 10 years. And a new committee is faced with the awesome task of giving the orders which will determine all guided-missile philosophy in the years ahead.

The Army, Navy, and Air Force collectively have bought about \$700 million worth of robot weapons in the past 5 years. Top

military men now say guided missiles are not only an accepted part of their defense pattern, but they are also to assume rapidly-increasing importance.

The new planning committee, which consists of top-layer military experts, is now engaged in pulling together the reports of production and performance.

Push Military Engineering . . .

Russia is not only producing more industrial scientists and engineers than the U. S. is—it is insisting that these skilled professional men concentrate their studies on military developments. Effect of this tough channeling policy is to provide the Communist military machine with a tremendous technological advantage in the planning and design of new equipment, particularly military items.

This means that U. S. draft officials must abandon any ideas of drafting its industrial engineers and scientists, the Pentagon's research bosses say. Says Assistant Secretary of Defense Donald Quarles: "We cannot afford to put engineers and scientists into uniform."

Mr. Quarles believes that the technological advantage that was on our side has been wiped out by Red numerical superiority in the total number of its scientists, plus the fact that Communist engineers now concentrate almost exclusively on military matters.

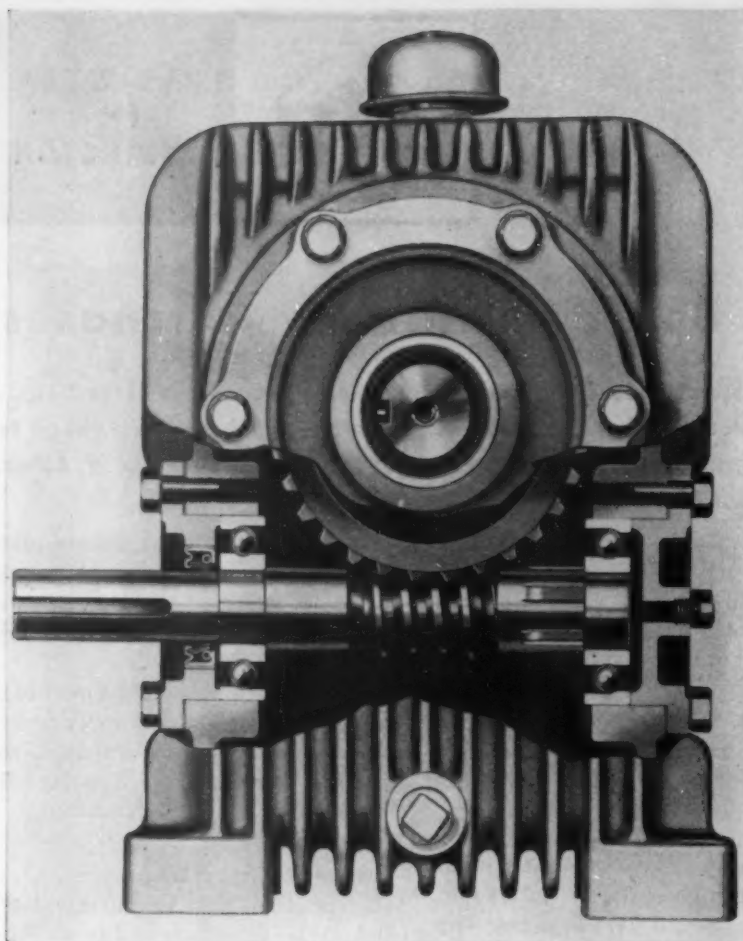
Boost Trade Fairs . . . American industry is being encouraged by the government to take a live-

Quote of the Week

A spirited objection to the notion that American businessmen are being killed off by hard work has been offered in the American Trade Association Executives Journal.

"Hardly an issue of a business magazine fails to remind the poor, tired businessman that the tempo of his life is killing him. We feel so sorry for ourselves that instead of saying goodbye when we part, we now say, 'Take it easy.' This is in some respects a fine thing. It makes our wives feel sorry for us and it makes us take more time for longer vacations. So far, so good, but it also worries the hell out of most businessmen so that they work with mental brakes set against their work and in mortal terror of a heart attack. They are afraid to live for fear of dying.

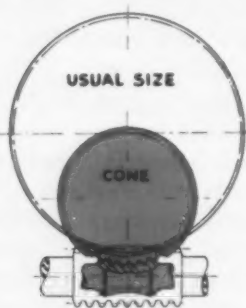
"Let's do away with this nonsensical neurosis and take our vacations and time off because we like vacations and time off—not because we're afraid we'll drop dead if we don't."



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lier part in international trade fairs as a means of expanding foreign commerce and bolstering employment.

A drive to interest more domestic firms in displaying their products at exhibitions in foreign countries is now in progress, U. S. Commerce Secretary Weeks says.

His agency's Bureau of Foreign Commerce is performing a survey to gather information on planned industry participation in international fairs. Thousands of firms will be contacted as a means of helping federal officials and businessmen develop worthwhile exhibits for use in these shows.

To expand its services related to trade fairs, Commerce Dept. intends to:

(1) Maintain a strengthened information center in its International Trade Fairs Operations Div., BFC.

(2) Provide companies with information that will assist them in arranging for displays at important exhibitions.

(3) Establish a joint government-industry exhibit, in addition to the company displays, at selected trade fairs abroad.

(4) Offer individual exhibitors services to enable them to derive the maximum benefit from this joint exhibit.

Watches:

Justice Dept. starts trade-restraint suit.

Government attempts to break up an alleged conspiracy between Swiss watch makers and American importers under the antitrust and tariff laws are aimed at protecting domestic production of timing and precision instruments by removing U. S. firms from "unfair competition."

Justice Dept. attorneys filed suit against 6 Swiss watch manufacturers and 18 American firms in Federal Court in New York. Defendants are charged with illegally conspiring to restrain trade in the manufacture, sale and importation of watches.

In July President Eisenhower granted pleas for a 50 pct hike in the duty on imported watches in

order to "protect America's capacity" to produce precision devices during an emergency.

American firms named in the suit included the Bulova, Benrus, Gruen and Longines-Wittnauer watch companies. Principal manufacturers of watches in this country, Hamilton, Waltham and Elgin, were not named.

Firms are charged with agreeing to restrict manufacture of watches and parts in the U. S.; fixing prices and terms of sale of Swiss movements here; conspiring to prevent American-made parts from being exported; blacklisting, boycotting or fining an American firm which refused to join the alleged conspiracy; setting the number of Swiss movements which would be imported to this country and refraining from importing other foreign watches, and fixing prices and restraining competition in the sale of imported watch repair parts.

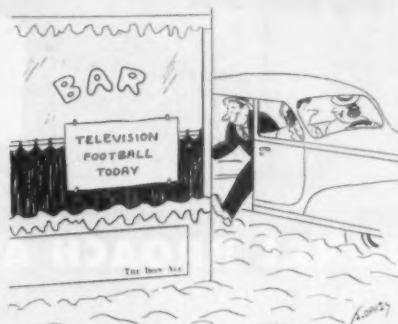
Justice Dept. commented that filing of the suit does not prevent negotiating a settlement with the government.

Disclose Debt Figures

Corporate business owes about half the private net debt in this country, U. S. Commerce Dept. statistics indicate.

Reviewing data on both public and private debt for 1953, the department says gross debt, before consolidation of accounts of affiliated private corporations or of government agencies, was about \$683 billion on Dec. 31.

Net debt, both public and private, amounted to \$585 billion. Of this,



"He say's he knows a short cut to the stadium."

WASHINGTON NEWS

private obligations made up 56 pct and public securities the remaining 44 pct.

Increase in net public and private debt was 5½ pct or \$29.5 billion during 1953.

Couplings Package Specs

Recommendations for simplified, standardized packaging of steel pipe couplings, requested by industry, have been published by Commerce Dept.'s Office of Technical Services.

The recommendations are formulated to eliminate available waste by establishing standard stock sizes. Compliance is voluntary. Similar programs have already been accepted by industry for malleable iron screwed pipe fittings and for various types of gas stopcocks.

Copies of the new recommendations, as well as other simplified packaging programs, are available from Office of Technical Services, Commerce Dept., Washington 25, D. C.

The recommendations on steel pipe couplings packaging as made by Commerce Dept. are:

Nominal Size of Coupling (Inches)	Quantity Per Package	
	Standard Couplings	Line Pipe Couplings
1/8	100	100
1/4	100	100
3/8	100	100
1/2	100	75
3/4	50	50
1	30	25
1 1/4	25	25
1 1/2	25	20
2	20	15

You Have to Be Small

Any business firm which describes itself as a small business and thereby qualifies to get a military procurement contract must actually be a small concern in order to retain the contract.

The U. S. Comptroller General points this out in a recent ruling under which the Army was advised to cancel a contract awarded to a low bidder subsequently found unqualified within the accepted definition of a small business—a firm which, with affiliates, employs fewer than 500 persons.

Reduce Broaching Costs ON SMALL JOBS

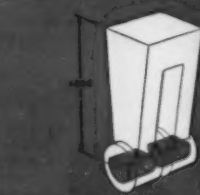
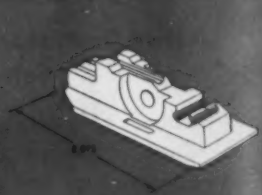
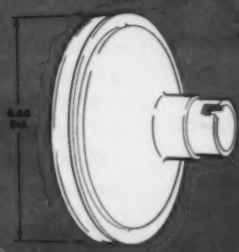
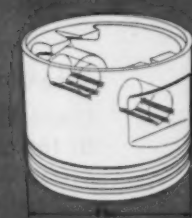


Here is your opportunity to reduce machine time and cut production costs on these small broaching jobs. And you avoid tying up your regular broaching machines which are built for heavier work.

The Red Ring Self-contained Broaching Fixture is a compact, portable, bench-type unit. Specifically designed for a particular job, it has all the elements (automatic and manual) of any well designed fixture. A pneumatic cylinder is added to pull or push the broach. Just connect it with the air supply and you are ready to start broaching.

These Red Ring Fixtures are used on a wide range of small jobs requiring a "Pull" not to exceed 2000 lbs. and a stroke of 25" or less. Here they are highly effective and very economical.

Investigate—talk with a Red Ring Engineer or write for Bulletin B54-9.



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Canned Wine, Milk May Boost Tinplate

Wineries, canmakers join forces, market-test canned product . . .
Wax lining beats taste problem . . . Dole flash-canning process, just on market,
may supplant glass, paper milk containers—By R. R. Kay.

♦ CALIFORNIA WINERIES, bottlers of some 65 million gallons of beverage wines per year, are blending their know-how with can makers. Together they may pop the cork on a huge new tinplate market.

Wine in cans is getting its first West-Coast trial in the San Francisco Bay Area and, if it proves profitable, will add to the new tinplate demand by brewers and soda-pop producers.

Yosemite Winery Assn., a group of 125 San Joaquin Valley (Calif.) grape growers, is marketing a 12-oz can of wine about November 1. Capped can, made at Continental Can Co.'s Oakland plant, is the same type as the one now used for soda pop. Crown Cork & Seal Co.'s Western Div. makes the cap.

See Big Market . . . Continental Can looks to a big market for cans in wine packaging. The firm also has a 32-oz. size which it hopes some wineries will soon use.

A spokesman for the wine industry said the idea was tried as far back as 18 years ago. But it didn't work because the container gave a metallic taste to the product. It's claimed that this is licked in the new can by the wax lining, sprayed on after the can is made.

Statewide, then national marketing of canned wine is planned if the San Francisco introduction takes on, according to Renald Mastrofini.

Launch Flash Canning . . . While on the subject of cans, the James Dole Engineering Co., Redwood

City, Calif., reports "encouraging developments" in the use of its patented aseptic canning machinery. Foremost Dairies, one of the country's large milk processors, has ordered high-capacity units for an extensive production program.

Big advantage claimed for the Dole flash-canning process is that the product retains its original flavor to a high degree. In fact, Foremost Dairies has introduced "fresh-tasting" evaporated milk. This should open up a big new market, for milk is one of the largest single food products packed in cans.

Equipment is either sold or leased.

Work For Shipyards . . . Hungry Seattle shipyards are easing the pangs with a few new contracts.

A \$15 million construction order for two destroyer-escorts went to Puget Sound Bridge and Dredging Co. Order for two 314-ft steel ships comes just as the firm is winding up two other jobs.

Commercial Ship Repair Co. added 350 employees to help handle Navy contracts for conversion of two landing craft. Company reports skilled manpower hard to find, as many workers had left the shipbuilding industry.

Expand Aircraft Facilities . . . Northrop Aircraft, Inc., with larger employment now than during World War II, is planning a multi-million dollar development and expansion of facilities at its main plant site at Hawthorne, Calif. The company will erect an engineering and research center to house its several thousand scientific personnel.

New 6000-ton aluminum extrusion press will be installed at Reynolds Metals Co., Phoenix, Ariz., plant to produce aircraft structural parts for the Navy. Reynolds received a \$5 million contract for installation of special equipment at its Phoenix and McCook, Ill., plants.

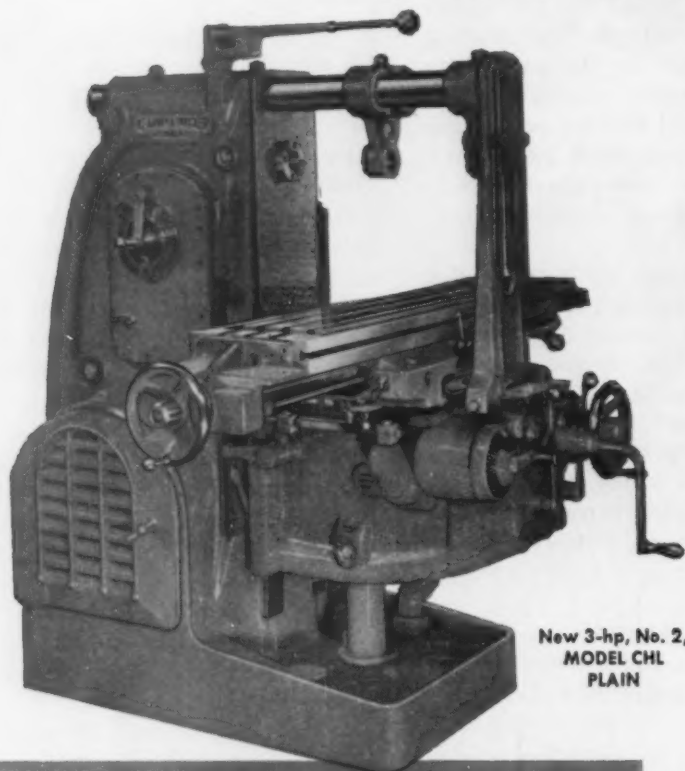
Seek Diversification . . . Elgin National Watch Co., Elgin, Ill., took its first major step in a diversification plan by purchase of Neomatic, Inc., Los Angeles, manufacturers of miniature electronic components. Elgin will operate the plant as a wholly owned subsidiary.



LESS THAN 23 CENTS PER HOUR

will put this new 3-hp, No. 2, Model CHL plain milling machine to work in your plant with

Kearney & Trecker's TOOL-LEASE PROGRAM



New 3-hp, No. 2,
MODEL CHL
PLAIN

NO! We didn't make a mistake. Under Tool-Lease Plan "A", one of three seven-year lease agreements offered by Kearney & Trecker, you are asked to make two semi-annual rental payments, totaling 25% of the machine's price during each of the first three years. Actually, in dollars and cents, you are asked to invest approximately 23 cents per hour for a new 3-hp, No. 2, Model CHL plain milling machine. That means a machine installed in your plant and in operation — for pennies an hour!

What's more, under Tool-Lease, you can rent any of over 250 standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative, or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

MACHINE TOOL OBsolescence IS BECOMING CRITICAL! WHERE DO YOU STAND?



Here's the picture in a typical industry — **GENERAL INDUSTRIAL EQUIPMENT** — (see chart below). Of the 6032 standard knee type horizontal, vertical, bed and manufacturing type milling machines and precision boring machines in use today — which can be replaced by Tool-Lease equipment — 22% are more than 20 years old, 33% are 10 to 20 years old, 55% are more than 10 years old!

Machines over 20 years old,
which should definitely
be replaced

Machines 10-20 years old,
which should probably
be replaced

Machines
less than
10 years old

605 automatic and manufacturing type milling machines

17% 34% 49%

1310 vertical milling machines

12% 34% 54%

3375 knee type horizontal milling machines

29% 33% 38%

259 bed type milling machines

23% 20% 55%

483 horizontal and vertical precision boring machines

1% 33% 64%

Figures adapted from 1953 American Machinist survey of metalworking industry



KEARNEY & TRECKER CORPORATION
6784 W. National Ave., Milwaukee 14, Wis.
Please send me Tool-Lease Bulletin TL-10A
and booklet titled "Critical Picture of
Creeping Obsolescence," or call Milwaukee,
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City..... Zone..... State.....



Toolmakers Will Sell Modernization

Distributors will woo 1955 buyer's market with productivity advantages . . . Aim to convince cost-conscious prospect that it's more profitable to buy new automated models—By E. J. Egan, Jr.

♦ IT'S GOING to become harder for the owner of an average U. S. metalworking plant to feel supremely confident about the up-to-dateness of the machine tools he operates. Any defense he puts up about their productivity will have to be a sturdy one. It will be challenged from all angles by machine tool salesmen.

Members of the American Machine Tool Distributors' Assn. weren't in any doubt about the buyer's market in their industry when they gathered in Cincinnati last week for their 30th annual meeting. But they got some practical, encouraging sales advice from top speakers.

Foreign Sales Low . . . Distributors learned that the burden of keeping the U. S. machine tool industry healthy is going to be their responsibility more than ever before. Foreign sales of the builders have dropped steadily since the end of World War II. With overseas competition getting tougher all the time, most U. S. builders are willing to concede that foreign sales won't improve

much beyond present day levels.

The case of such a close neighbor as Canada offers some proof for this belief. In 1953 Canadian industry bought 43 pct of its new machine tools from U. S. builders, whereas the pre-World War II rate was 90 pct.

Beat The Bushes . . . With the potential machine tool market confined more and more to the 48 states, sales activity will be stepped up to a rapid pace. Buyers are going to hear about obsolescence from every salesman that walks in the door.

Builders and their distributors don't want prospects to feel that there's going to be a lot of "fast dollar" chasing in the machine tool industry. Machine tool people claim that the nation's productive capacity could lag seriously in a few years if obsolete equipment isn't replaced faster.

Low Pressure Sell . . . Sales emphasis will be concentrated on education and understanding instead of the fast pitch. And such incentives to replacement as auto-

mation, accelerated depreciation, and leasing and rental plans need a lot of explanation.

Distributors were warned at their convention that they'd better learn all the answers before they attempt the big missionary job. Where a special purpose machine tool setup is the cost-saving solution to an obsolete assortment of machinery, the salesman will have to be an engineer as well. He'll have no catalog and price book to cover the situation.

Spell It Out . . . In another case, if the prospect isn't aware of the accelerated depreciation provisions of the new tax law, the salesman must be able to offer a clear explanation.

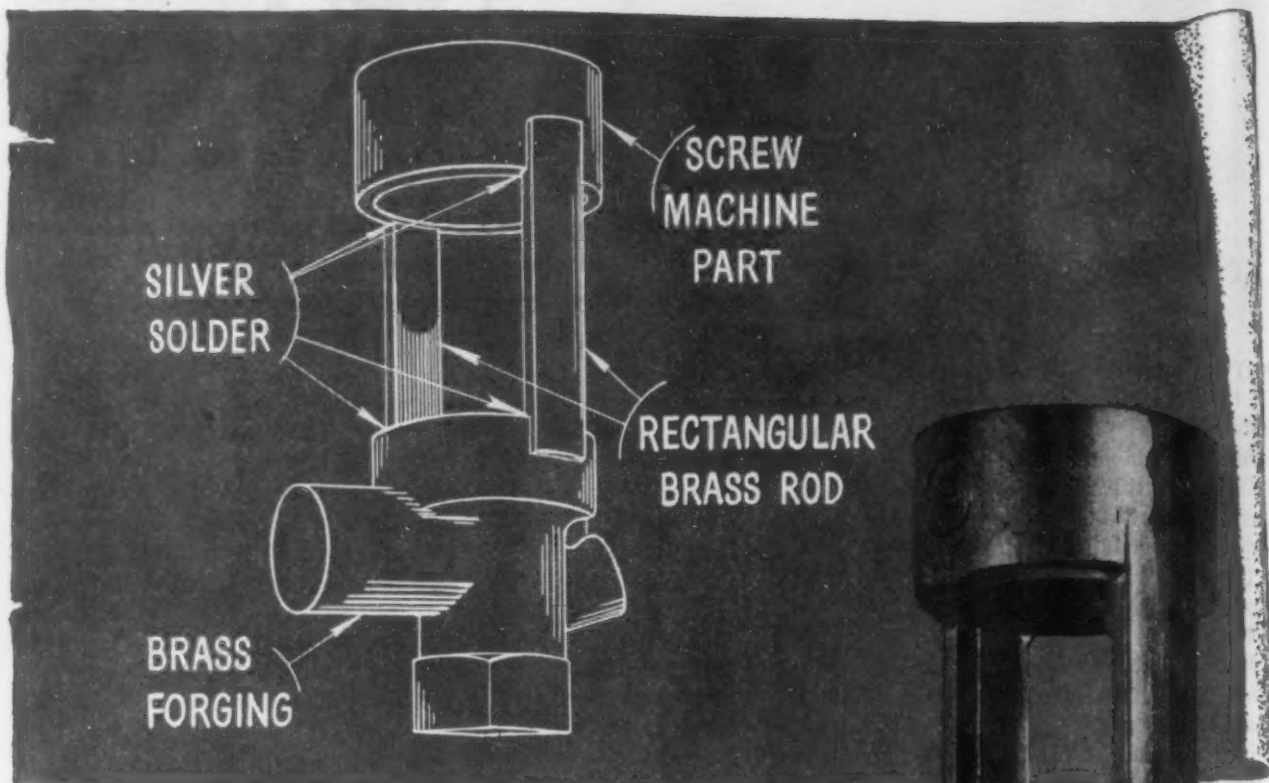
In just a few short months, machine tool prospects have been bombarded with a variety of buying incentives in the form of leasing and easy payment purchase plans. Many builders and their representatives confess to being somewhat confused by the various terms and claims. They admit that prospects must be even more bewildered.



NEW OFFICERS of American Machine Tool Distributors' Assn. are (l. to r.): Raymond Vidinghoff, president; Henry Hanson, vice-president; J. F. Owens, Jr., second vice-

ident; Frank Habicht; secretary-treasurer; James Kelley, general manager. The association held its 30th annual meeting in Cincinnati last week.

REVERE Brass Forging

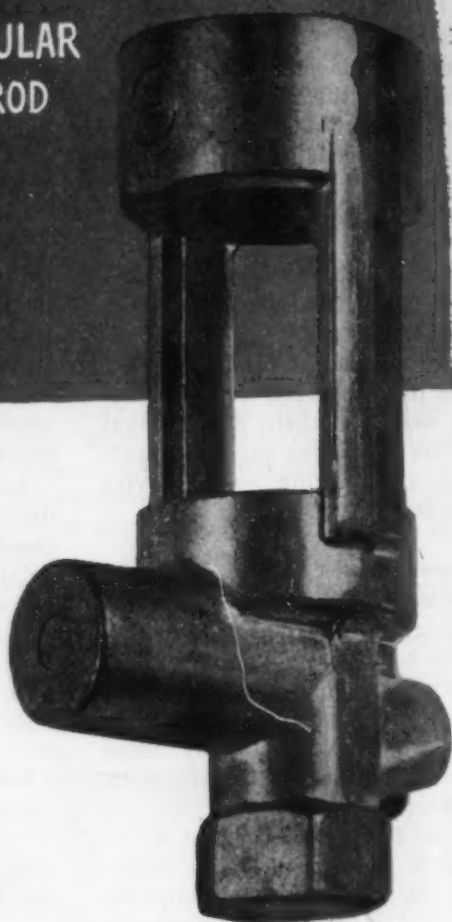


MAKES 1 PART OUT OF FOUR ... saves money

The one-piece brass forging shown here replaces a built-up part, formerly made of a screw-machine part, a forging, and two rectangular bars, assembled by four silver-soldered joints. The latter in turn replaced an iron casting, which was more expensive than expected, due to rejects. The part goes into a visible force-feed lubricator, which can operate at several thousand psi., and can be controlled to feed just a drop at just the right time to such equipment as compressors.

We suggest you look into forgings of copper, brass, other copper alloys, aluminum alloys. The forging process produces parts that are dense, non-porous, have many design details accurately and smoothly executed, require a minimum of machining. Revere knows a great deal about the forging of non-ferrous metals. In the case shown here, we collaborated closely with the customer in designing the part so it could be forged in one piece instead of being assembled out of four different items. The result is a better part, and appreciable economies.

For information about forgings, see the nearest Revere Sales Office.



Partially-machined brass forging for sight feed of force-feed lubricator.

At top, drawing showing how this part formerly was assembled out of four different pieces.

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Founded by Paul Revere in 1801

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*Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.;
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Sales Offices in Principal Cities, Distributors Everywhere.*

SEE "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS



The Iron Age

SALUTES

Fred C. T. Daniels

For a half-century he's been solving the tough problems for the steel industry . . . His contributions to rolling-mill technology are too numerous to catalog, 18 of them are patented.

After a half century more or less in the roll-making business, Fred Daniels is retiring next month. And the steel industry is likely to agree that in his field Fred made some of the most significant contributions to the progress of steelmaking.

Fred Daniels is vice-president for research and development for Mackintosh-Hemphill Co., Pittsburgh. Like many another man devoted to research, he's not inclined to talk too much about his own accomplishments. But here are a few:

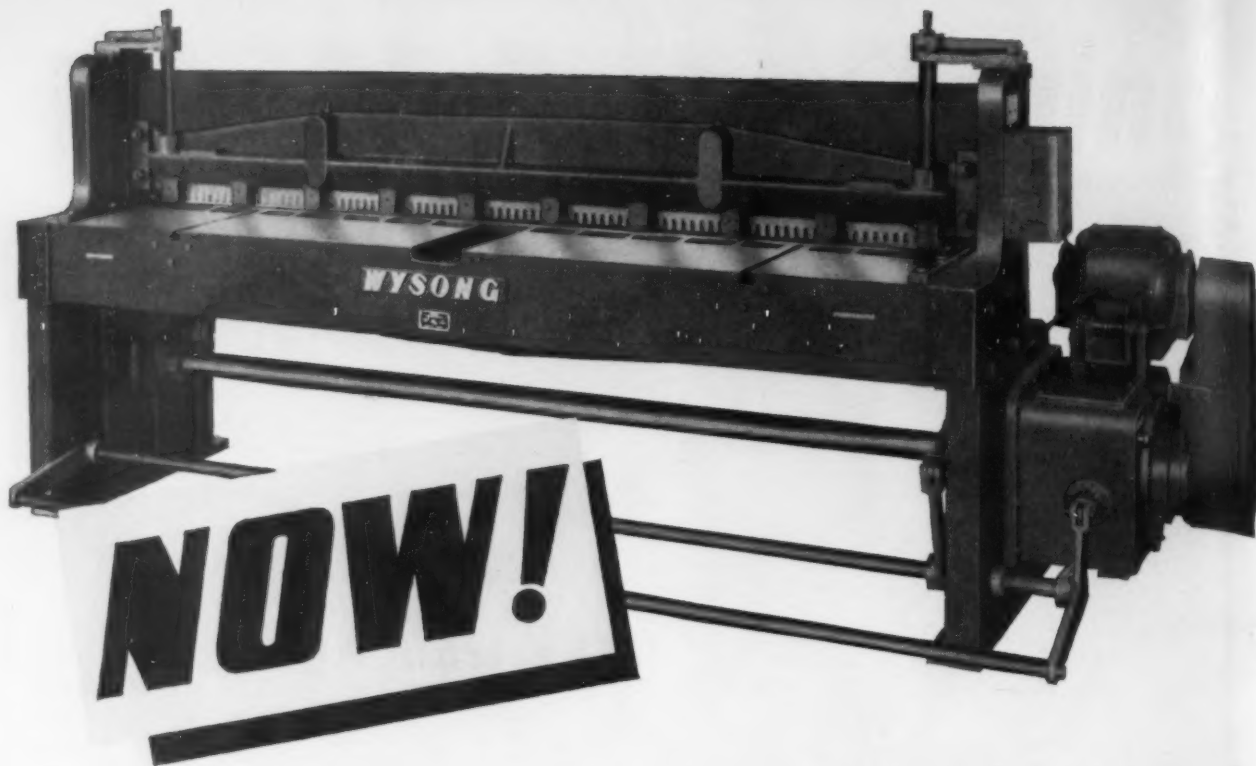
A major part in development of high-carbon, alloy steel rolls; low-phosphorous alloy acicular cast iron; the Techni process for iron and steel rolls; graphitized, high-carbon alloy steel; design of a double-pour process for casting enriched alloy hard-iron work rolls in four-high strip mills; shape rolls for cold-forming electricweld pipe mills; development of heat-treatment for special alloy steels giving high impact values for heavy-duty applications. He holds 18 patents.

After his graduation from Worcester Polytechnic Institute Fred Daniels went to work for Mack-Hemp in 1904 as a chemist. He left there in 1912 and worked for several companies in research and production until 1928, when he returned to Mack-Hemp.

Between 1936 and 1938 Fred worked the European "beat" for the company, teaching American roll-manufacturing practice and mill applications to Mack-Hemp affiliates.

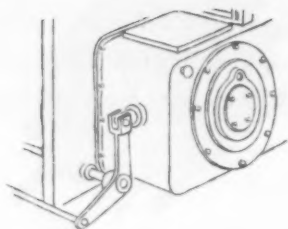
Fred's retirement will be anything but the rocking-chair variety. He will do some consulting and advisory work. And, when he's not busy at that, he'll spend time sailing his 22 ft cabin cruiser "Trojan" in Barnegat Bay or tending to the ills, if any, of the white-face Hereford beef cattle on his 130-acre farm near Beaver, Pa. Those nine grandchildren of his also will find him more available than in the past.

Incidentally, the initials "C. T." in Fred's name stand for Clinton Tilton, a family name.

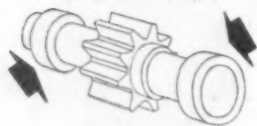


THE GREATEST SHEAR VALUES EVER OFFERED

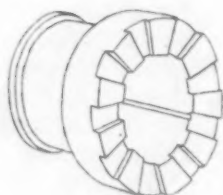
You will be pleasantly surprised to learn how little it costs to own and operate a shear with each of the fine features listed below:



Fully Enclosed Drive Unit.
Gears Run in Oil.



Straddle Mounted Gears.
Longer Gear Life.



9-Jaw Clutch. Positive.
Unsurpassed in Performance.

- Fully Enclosed Drive Unit. Clutch and Gears Run in Oil.
- Straddle Mounted Gears. Accurate Meshing. Longer life.
- 9-Jaw Clutch . . . Quick Acting . . . Trouble Free.
- Built-in, Non-Repeat Unit . . . Merely Turn a Knob.
- Top Center Indicator. Visual Check on Proper Operation.
- Self-energizing Brake. No Drag on Down Stroke.
- Four-edge Blades, Each a Cutting Edge. Hollow Ground.
- Compensating Holddown. Equalized Pressure from end to end.
- Metal Finger Guards.
- Ball-Bearing. Precision Back Gauge. 1/128th inch setting.
- Front and Side Gauges.
- Massive, High Tensile Castings. Greater Rigidity. Hold Accurate Alignment Far Longer.

On Every Wysong Power Shear all of these features are Standard Equipment. Capacities range from 16 gauge through 1/4" mild steel; cutting lengths from 48 inches through 12 feet. For highest production at lowest cost, "Buy a WYSONG . . . It's MILES Ahead".

WYSONG
Builders of Precision Metal Working Machines

Wysong and Miles Company, Greensboro, N. C.

Easy to fabricate—

Electrolytic Nickel-Clad Plate Offers Low-Cost Corrosion Protection

By S. G. Bart, President, Bart Mfg. Corp., Belleville, N. J.

◆ Nickel, electrodeposited on mild steel plate in thicknesses of 0.006 to 0.020 in., provides a low-cost material for fabricating assemblies which require corrosion protection . . . It can be roll formed, die formed, flame cut, sheared and welded . . . Now used extensively for fabricated industrial components.

◆ Any grade of mild steel can be clad . . . After cladding, surfaces are checked for porosity, adherence, ductility and hardness . . . Uses include many in food and chemical processing, storage tanks and handling equipment . . . Nickel plate hardness is 140 to 160 Vhn . . . Tensile strength is 50,000 psi.

◆ **TAILORED THICKNESSES** of nickel, electrolytically bonded to mild steel plates, are greatly extending the uses for nickel clad material. The new process, recently developed by Bart Mfg. Corp., Belleville, N. J., makes available a clad material which is economical to use for the control of contamination and corrosion.

Pure nickel can be deposited in any thickness from 0.006 to 0.020 in. by this process. The thickness is not controlled by the thickness of the steel. The material, called Lectro-Clad steel, fills a gap created by roll cladding in which 5 pct nickel is not available on plates less than $\frac{1}{2}$ in. thick.

Several new methods for pickling, cleaning and etching are represented in this development.

It is a direct outgrowth of a process for nickel lining seamless steel pipe and fittings which have been used widely in atomic energy installations, chemical and petroleum processing and pulp and paper manufacture, to control contamination and corrosion.

At present, Lectro-Clad steel is used extensively for fabricating a variety of industrial components. Some manufacturers are doing heavy forming operations with the new material. It is being roll formed in one of the largest

roll forming facilities in the East, and other parts are die formed by hydraulic press. Parts are also formed with impact dies. The material is easily flame cut and sheared.

When large fabrications are welded, stress relief may be required. An anneal cycle of one hour per inch of thickness at a temperature of 1100° to 1200°F eliminates or reduces localized stresses. When annealing or hot working the material, the clad surface should be protected from atmosphere gases at elevated temperature by coating it with a paste mixture of lime or welding spatter compound. This can later be removed by chemical cleaning and wire brushing.

No special cleaning is required to produce a clean clad surface on the finished product. To remove foreign matter from the clad surface, or rust and mill scale from the exposed steel surface, chemical cleaning with stabilized acid and alkali is satisfactory.

Wire brushing saves cleaner

The chemical cleaner can be conserved by removing slag and loose machine chips by wire brushing and compressed air. Objectionable surface stains can be removed effectively with a mixture of chromic and sulphuric acid. Wire brushing produces a polished sheen surface, and

**Nickel can be deposited at higher rates, but 0.003 to 0.005
is the optimum rate for smooth, pore-free surfaces . . .**

degreasing results in a chemically clean surface.

Various sizes of nickel-plated plates can be turned out at the rate of 100,000 sq ft per month. Steel plates clad on one side range from 3/16 to 2 in. thick, 18 to 84 in. wide, and 60 to 240 in. long. Sheet, clad on one side, ranges from 7 to 14 gage, with the same width and length range as plate. Sheet is generally clad with 0.006 to 0.008 in. of nickel. Cladding on plate is 0.008 to 0.010 in. thick, with a maximum of 0.020 in.

Steel backing plate used at present is plain low-carbon steel, normally an A-285 Grade C firebox quality. However, there is no limitation as to the types of mild steel which can be clad. Selection of steel is based on the end use of the clad product and the design which will dictate the fabrication and joining methods.

Rigid quality control with regard to all factors that could affect the final product—steel selection, plating solution maintenance and control and post-plating inspection—is the key to the uniform quality of the plated steel.

Thorough cleaning improves bond

Prior to racking, the steel plates are visually inspected, and surface defects such as laminations, cracks and other faults are ground out with portable grinding equipment. Plates are then welded to large I-beam racks to facilitate handling during plating.

Practices normally followed in high quality nickel plating are observed in the plating cycle. Steel plates are anodically cleaned in a commercial alkaline cleaner at 180°F to remove oils, glue and dirt. They are then cathodically pickled to remove mill scale. Plates are then returned

to inspection, where newly revealed surface defects are ground out. They are then reprocessed in the preliminary cleaning cycle.

Following cleaning, plates are etched anodically in sulphuric acid. Under carefully controlled conditions of temperature, constituent and current density, a chemically clean steel surface with proper grain structure results. This insures a tenacious bond between the nickel and steel which withstands subsequent fabricating operations. It also eliminates the need for sand blasting.

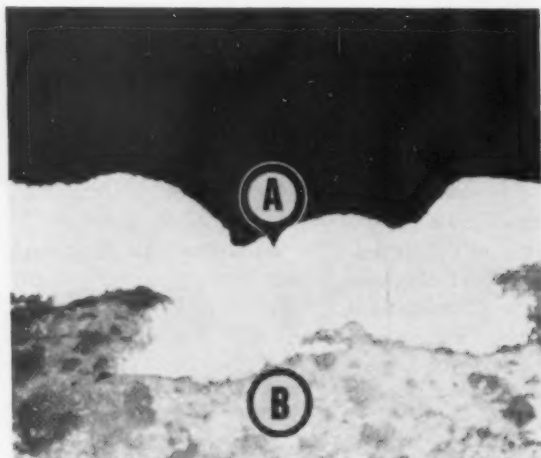
Metal concentration kept high

In the nickel plating bath, the metal is deposited at the rate of 0.003 to 0.005 in. per hour. Nickel can be deposited at much higher rates, but this is the optimum rate which will produce a smooth and pore-free surface.

The nickel solution used is a modified Watts type, operated at a temperature of 145° to 155°F. Metal concentration is kept at a high level to permit operation at higher current densities, yet assure uniform metal distribution over the large surface.

An essential part of the quality control program is plating solution maintenance. The solution is chemically controlled daily for pH, nickel sulphate, chloride and surface tension. It is purified at high pH with nickel carbonate at frequent intervals to remove foreign metals and contamination. It is also continuously purified by low-current density plating to remove copper and other impurities.

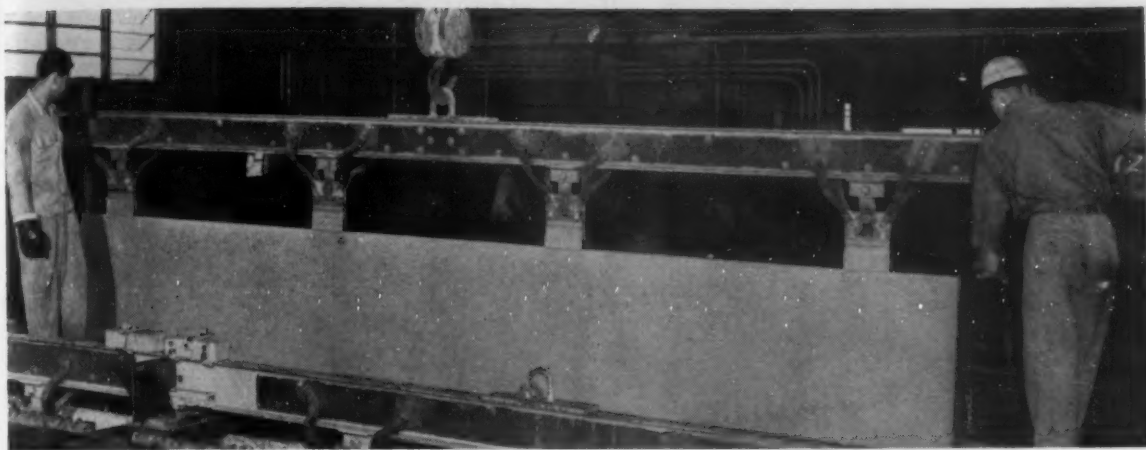
Continuous filtration through activated carbon is carried out in a battery of specially de-



NICKEL PLATE (A) completely protects carbon steel plate (B), even in pitted sections, die and tool scores, and draw marks (100X).



DEGREASER is only one of many uses for newly developed Llectro-Clad plate which gives good corrosion protection and material economy.



LARGE PLATES are handled singly in plating, but smaller plates are handled eight at a time.

signed filters which provide a high flow rate in the continuous cycle.

Power requirement for this installation, which total 48,000 amp dc output at 12 v, are furnished with Sel-Rex selenium rectifiers. In an intermittent operation of this type, the selenium rectifiers give considerable power economy. They are completely sealed and water cooled for corrosion protection, and are maintenance free even though they are located near the plating tanks to minimize the bus bar run.

An extensive testing program insures good physical characteristics in the finished plated plate. Following final rinsing, plates are immersed in an aerated hot water bath at 180°F for 30 minutes, as a porosity test. In 30 minutes, even tiny pores in the clad surface will show discoloration that can be a cause for rejection.

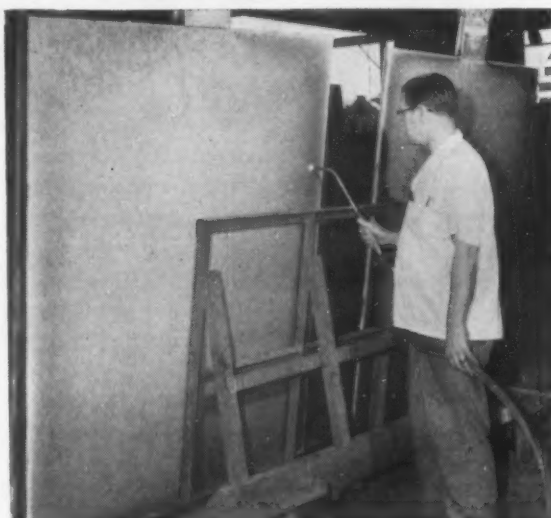
Adherence of the nickel is determined through a flame test. The plated steel is heated to a temperature above 1200° F at several points with a torch and then examined for blistering.

In addition to the plate tests, sampling tabs are welded to each rack. These tabs are thoroughly tested for porosity, ductility and hardness. Micrographic analyses are also made periodically on sections sheared from plates.

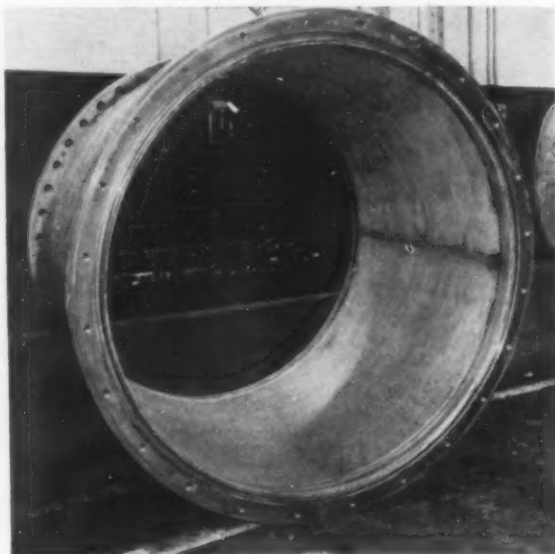
The nickel plate has a hardness of 140 to 160 Vhn. Tensile strength is 50,000 psi and the elongation is 30 pct in 2 in.

While all potential uses for this new material have not yet been fully explored, the physical characteristics as well as economy factors indicate a growing importance for the material for many types of processing equipment and storage vessels.

Within the broad limits of application for 0.020 in. of nickel, Lectro-Clad steel offers greater economy for all kinds of industrial equipment requiring corrosion and contamination control. Its economy, combined with its permanence, makes it an ideal material for upgrading installations now utilizing organic coatings.



ADHERENCE of nickel plate is checked by heating to above 1200°F. After heating at several points, plate is inspected for blistering.



SHEARING, rolling, flame cutting, flanging and welding left the nickel surface on this assembly entirely free from damage.

Cushions impact—

Improved Rods and Techniques Overcome Crack Sensitivity in Magnet Steel Welds

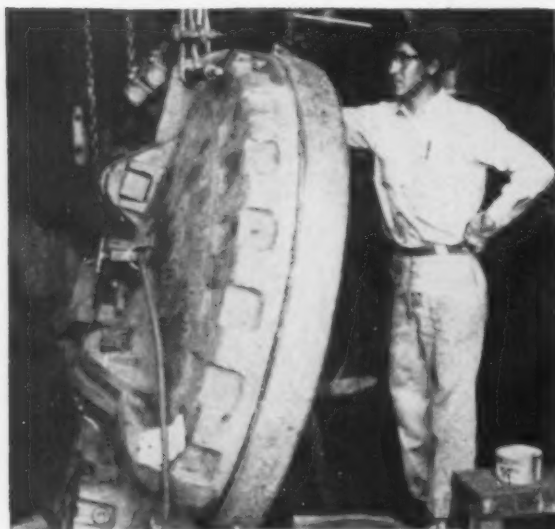
♦ Low-temperature electrodes used in conjunction with improved welding techniques were teamed up to overcome a tough repair job on electromagnets . . . Welds had to be free of crack sensitivity . . . Corrosion resistance, impact resistance and adequate strength were other requisites . . . Low heat input prevented damage to insulation on inner coil windings . . . High nickel improves fluidity.

By J. J. Obrzut, Metal Finishing Editor

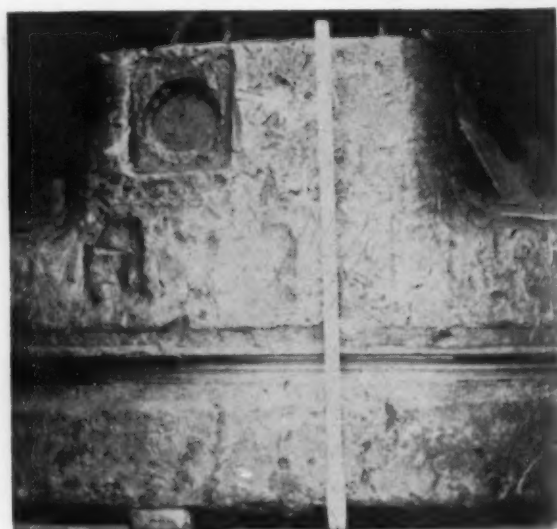
♦ **CRACK SENSITIVITY** is a problem that cannot be tolerated in welds which join the cast steel case of an electromagnet to the cast manganese-steel lifting face. To replace damaged windings in the magnet, the case must first be separated from the face by machining. In rewelding these parts, crack sensitivity can be avoided by the ap-

plication of proper welding rods and techniques.

Use of a cast steel in combination with a cast manganese steel in itself presented a problem. Manganese, as an alloying element, deoxidizes and desulphurizes steel. It has the effect of cleaning molten metal of impurities which impair strength and ductility. It also combines



POSITIONING of magnet for downhand welding simplifies operation, results in better welds.



GROOVE between cast steel case and cast manganese steel face is prepared by machining.

with sulphur to offset embrittlement. Used in high percentages, it increases the toughness of steel. However, it may also increase crack sensitivity.

The problem of repair is complicated by the rigid service requirements of the welds. No cracks can be tolerated since water seepage may damage the windings. Impact resistance is essential to withstand rough usage in handling scrap loads up to 10 tons. In addition, welds must have high corrosion resistance and sufficient strength.

Coating ingredients for good shield

EutecTrode 680 welding rod, made by Eutectic Welding Alloys Corp., Flushing, N. Y., was selected because it possessed these properties. A heavy, specially formulated coating minimizes porosity and slag inclusions in the weld deposit and materially improves ductility and impact resistance.

Gas-forming ingredients in the rod coating provide an atmosphere which shields the weld from the harmful effects of oxygen and nitrogen. Losses across the arc are restored by the addition of metallic components to the coating.

A stable arc with a controlled melting rate is essential in welding heat-sensitive materials, and particularly where excessive heat may damage insulation on the coils. High nickel content in this alloy rod gives it high fluidity and assures dense, uniform welds with excellent contour.

The protection of refractory slag retards solidification of the weld and permits the solid impurities, such as metallic oxides, sulphur and phosphorus, to rise to the surface. This controlled cooling rate also permits dissolved gases to escape.

In welding, the two castings, the case and the

face, are carefully positioned and clamped together. The groove between the cast sections is about 1 in. wide and little more than 1 in. deep. The thickness of the castings range from 3½ and 4 in.

Welding is done at 95 amps, direct current reverse polarity, using a 5/32-in. electrode. Use of low amperage prevented an undesirable amount of heat being absorbed by the casting.

Root welds were applied as continuous stringer beads without rod manipulation and with a short arc. Succeeding arcs were struck on deposited metal and were broken at all times on weld deposits. This prevented formation of hard spots and avoided excessive heat input. Each pass was allowed to cool gradually and was then peened to relieve residual stresses. This was followed by wire brushing to remove slag. During welding, the castings were rotated to allow the operator to use a downhand welding technique. The root weld has a tensile strength of up to 110,000 psi and is exceptionally resistant to shock.

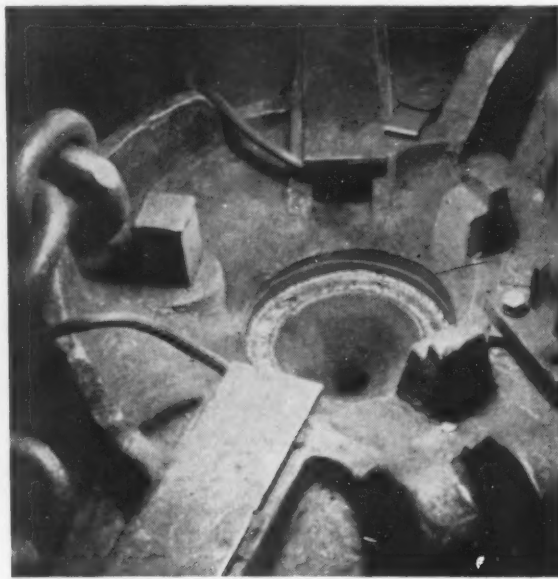
Different rod for fill

After the root beads had been applied, Steel-Tectic No. 1 rod was used for the filling passes. This rod can be applied at extremely low amperage. For a 3/16-in. diam electrode, the welding machine was set at 90 amp. The resulting deposit had a tensile strength of 72,000 psi and was fully machinable to the desired dimensions.

Examination revealed no visible signs of cross-checking or porosity. Examination of the welds after 3 months of rough service revealed no signs of weld failure. Low heat input of these specially formulated electrode was responsible for avoiding damage to the insulation on the coil windings.



ROOT BEADS are applied with rod having good impact resistance and high strength.



INNER SOLE of magnet must be watertight and strong to prevent damage to coil windings.

Using matched dies—

Cold Rolling of Serrations Strengthens Shaft, Lengthens Life

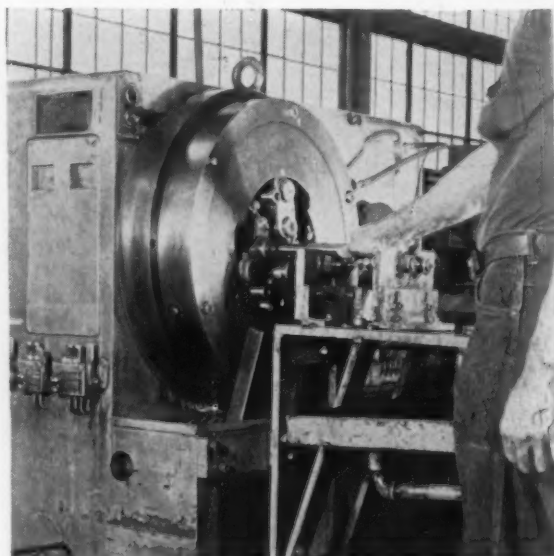
- ◆ Serrations formed by cold rolling greatly improve the service life of steering gear worm shafts by increasing their resistance to tension, shear and fatigue loading.
- ◆ Close tolerances are maintained on both tubular and solid shafts of alloyed and unalloyed steels . . . Die life is in excess of 500,000 shafts . . . Process gives greater accuracy at lower cost.

By W. G. Patton, Asst. Technical Editor

◆ **STEERING GEAR** worm shafts play a vital role in highway safety and, as such, must have the best combination of strength and ductility to guard against failure. Processing studies at Saginaw Steering Gear Div., General Motors Corp., showed that the ability to stress serrations in compression on the shaft end by rolling adds greatly to the serviceability and dependability of the steering gear assembly.

The studies also indicated that production of steering gear worm shafts could be increased and costs lowered by substituting the cold-rolling process for hobbing. In forming the 36 serrations on the shaft end, tolerance of critical dimension is less than 0.002 in. In addition to greatly increasing production, the rolling operation requires less than 25 pct the floor space previously occupied for hobbing.

Flexibility of the cold-rolling method was given serious consideration before it was adopted. Although the Saginaw shafts fall into four basic sizes, this factor was important since the firm produces steering gears for nearly 100



THREAD-ROLLING MACHINE, adapted for forming serrations in steering gear worm shafts, has speeded production and improved quality.

different models of passenger cars, trucks, tractors and earth-moving equipment.

Some shafts are made from steel tubing, while others are produced from solid steel bars. Carbon steel may be specified for the upper shafts while alloy steel is used for the worms. In each case, maximum strength and ductility are required.

Parts are fed manually into Reed and National Acme thread-rolling machines. These machines are fully adjustable, both as to openings between the rolls and their feed rate. Accuracy of the serrations is held more closely than in hobbing.

One model of steering worm calls for the use of SAE 5120 hot-rolled alloy steel. Before forming the serration, the end of the shaft is turned to 0.780 in. After rolling, the outside diameter of this shaft end may be, for example, 0.811 in.

As in thread rolling, the finished diameter of the rolled part is greater than the original diameter. While saving of material is not a big factor on steering gear worm shafts, the steel saved may be important on other parts which can be rolled by this method.

Finished diameter is larger

On another steering gear worm shaft, the specifications call for a turned diameter of 0.666 in. at the end of the shaft. This dimension is required before the 36 serrations, having an included angle of 90°, are formed. However, after rolling the serrations, the outside diameter at the end of the shaft increases to 0.692 in. This increase is typical of all shafts rolled by this method.

Serrations made by cold rolling range from 0.026 to 0.031 in. deep. In a typical shaft, there are 36 serrations, each having a 90° included angle. Experience thus far indicates that half a million pieces can be expected from a single die that is properly designed and lubricated.

Shafts are fed into the machine manually. Three synchronized cylindrical dies rotate around the part simultaneously as the blank floats between them. Matched precision of the dies makes it possible to control the form of the serrations within carefully prescribed limits. Dies are made of hardened and ground high-speed steel.

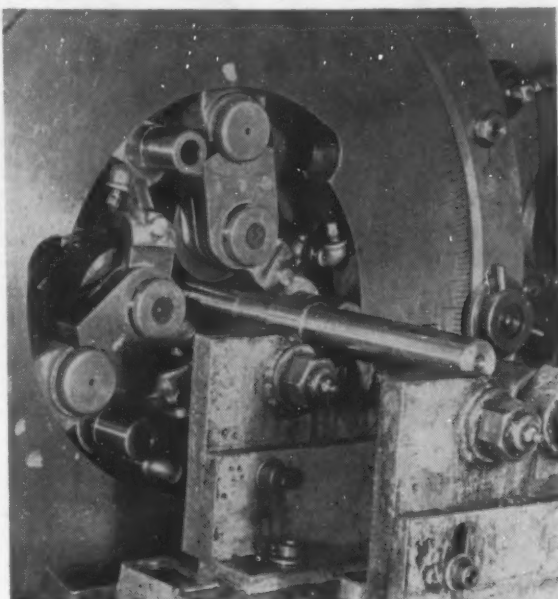
Quick setup changes

Adjustable scroll rings in the head of the machine permit accurate setting of the dies. Final sizing is obtained by adjusting a micrometer screw. Setup and changing from one job to another is done very quickly, making the equipment readily adaptable to short-run production.

Machine feeds and speeds can be varied within a wide range by adjustment of cams. Change gears provide positive repetition of the cycle, including penetration, dwell and release. The operator merely loads the blank into the dies and removes it after rolling. The process for hollow steel tubing is essentially the same as for solid shafts.

Tests show that the increase in tensile strength resulting from cold rolling is about 10 pct. Shear and fatigue properties are higher than those obtained by hobbing.

After forming the serrations and completing other machining, the steering gear worms are carburized for optimum strength, resistance to fatigue failure and wear resistance.



SYNCHRONIZED cylindrical dies rotate around shaft end. Matched precision of dies gives close control over form of serrations.



CRITICAL dimensions on worm shafts are within 0.002 in. After rolling the serrations, shafts are carburized to improve wearing qualities.

Controlled Electrolytic Deburring Replaces Costlier Hand Methods

♦ **ELECTROLYTIC DEBURRING** offers large potential savings over costly hand methods for processing close tolerance steel parts too delicate to deburr by bulk tumbling or sand-blasting. The electrolytic method may also save certain polishing operations preparatory to bright plating. In some cases parts emerge from the deburring tank bright enough to eliminate the need for further polishing.

Since 1950, electrolytic deburring has been economically applied to some 4 to 5 million parts annually at the Endicott, N. Y., plant of International Business Machines Corp. The process will be used still more extensively when automatic equipment now on order is finally installed, although tumbling and sandblasting will continue to be used wherever possible.

Experimental electrolytic deburring is done in the hand tank illustrated here. It is lead lined and has a steam jacket to heat the electrolyte to 180° F. Exhaust ducts for fume removal are placed at both sides. The power source is a 12 volt, 500 amp rectifier adjustable to apply 50 to apply 50 to 500 amp per sq ft, the setting depending upon the size and nature of the pieces being deburred.

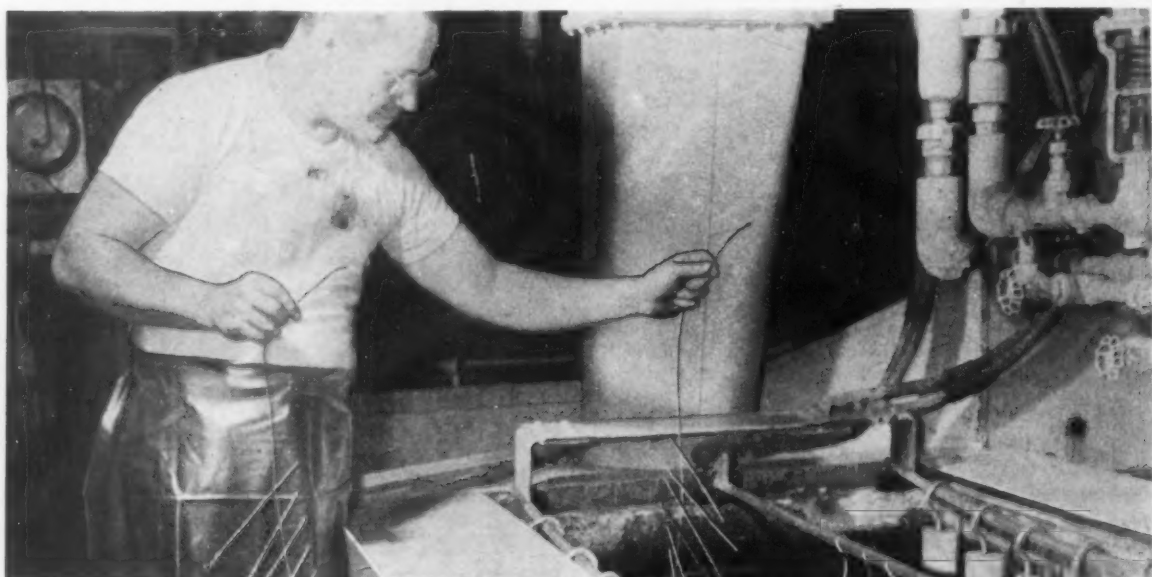
At present, only steel parts are electrolytically deburred in production. Many of these are of

the stainless type which is brightened by the treatment. The cathode is copper and the steel parts constitute the anode. Electrolyte content is 42½ pct sulfuric acid, 42½ pct phosphoric acid, 10 pct water and 5 pct of a proprietary brightener. Parts are wired for the experimental work but are usually racked for production deburring.

Immersion time averages about 3 minutes but varies according to the part, current density and results required. If burrs are heavy, time may have to be increased. But since metal is removed from all surfaces (though fastest at burrs, sharp edges and points) care must be exercised to avoid dimensional changes sufficient to cause part rejection.

If necessary, critical dimensions can be machined to allow extra metal. As a rough guide, a 10 minute dip will remove about 0.001 in. of surface metal, and somewhat more at sharp edges.

Burrs in holes or recesses can usually be removed electrolytically but occasionally are not affected because of their location and must be removed by other means. The electrolytic process removes scale from heat treated parts and is sometimes applied for this reason. This brightening action is highest on stainless steel.



SMALL tank for experimental electrolytic deburring of close tolerance steel parts.

High-Frequency Induction Furnaces Boost Foundry Melting Capacity, Widen Range of Metals Handled

♦ Making centrifugal castings that range in weight to 60,000 lb in nonferrous alloys poses many production problems . . . Making large centrifugal castings from ferrous alloys is more difficult.

♦ To meet these problems, faced in a long range program aimed at widening the range of materials handled, Sandusky Foundry and Machine Co. recently installed high-frequency induction melting units . . . Now the foundry handles stainless, carbon, alloy, and special high alloy steel grades.

By W. D. Latiano,
Metallurgical Editor

♦ HIGH-FREQUENCY induction melting equipment has greatly increased the range of materials which can be melted and the flexibility of melting operations at the centrifugal casting foundry of Sandusky Foundry & Machine Co., Sandusky, Ohio.

The use of induction melting equipment marks a major step forward in the development of the 50-year old producer of centrifugal castings. The addition of 6 induction melting units, part of a long range program now more than half completed, has made possible the pouring of ferrous as well as nonferrous metals in multi-tonnage castings.

The high-frequency induction furnaces, which supplement and in some cases replace oil-fired furnaces, have simplified melting techniques. Improved physical and chemical qualities in castings, and cleaner shop conditions have resulted.

The company has long specialized in production of large centrifugally cast nonferrous bearings, bushings and rolls some weighing up to 60,000 lb. The plant is now able to produce 20,000-lb castings in heat and corrosion resistant stainless grades and in straight carbon or low-alloy grades. Many special grades of tool steels can also be cast in centrifugal molds.

Many of the large castings are used for paper-making machinery and for large marine bearings and bushings. But a host of other parts—liners, rings, pump rotors, shaft sleeves and cylindri-

cally shaped parts widely used in industry—are produced as individual parts or machined from centrifugally cast stock.

Properly made centrifugal castings offer close as-cast tolerances, uniformity of structure and chemistry, and freedom from porosity. In smaller sizes, castings have been made in both ferrous and nonferrous metals for some time. The making of large centrifugal castings by induction melting in the ferrous grades is an important contribution to metalworking.

The Sandusky Foundry & Machine Co. has successfully melted nonferrous materials in open flame rotary oil-fired furnaces of their own design. These, however, will not melt at a high enough temperature for most of the ferrous metals. To meet this problem SF&M decided to replace some of its oil-fired furnaces with high-frequency induction furnaces.

Supplementing the three Ajax-Northrup induction melting units, already installed is a totally enclosed water-cooled generator unit.

Melting equipment was engineered by the Ajax Electrothermic Corp., Trenton, N. J., and built by Ajax and General Electric Co. When all induction melting units have been installed (within a year) it will be possible for SF&M to melt single heats of 40,000 lb, or to simultaneously melt several heats ranging from 500 to 10,000 lb. Ferrous and nonferrous metals can be handled in any unit by switching furnaces in the various melting stations.

Can be operated simultaneously

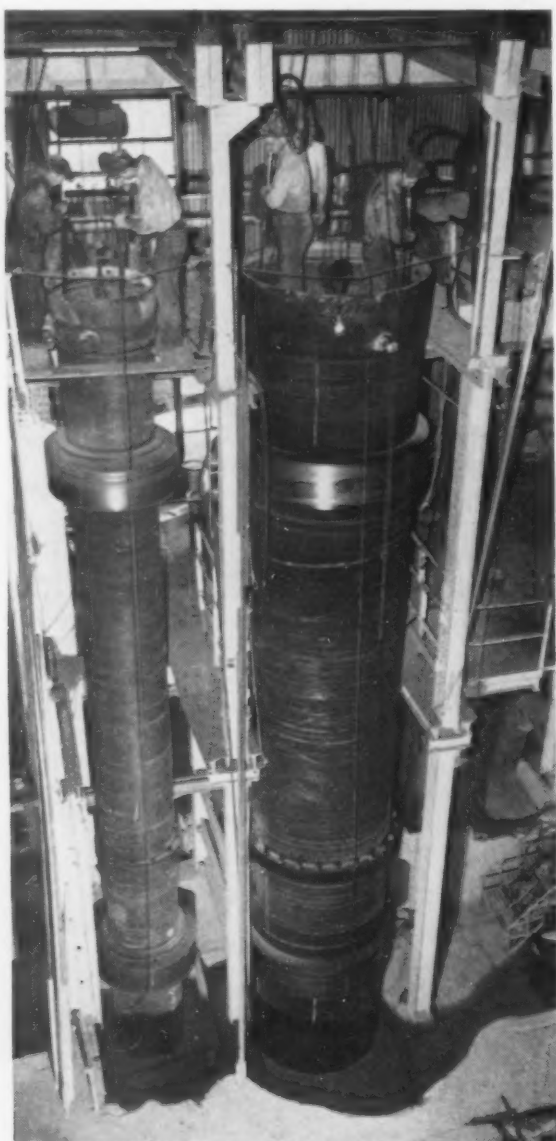
The three melting stations installed at present are so arranged that station 1 and 2 can be operated simultaneously: Station 1 with 350 kw applied to a 500 lb capacity furnace and Station 2, with 900 kw applied to either a 1000 or 2000 lb capacity furnace. Controls are arranged for applying 1250 kw or the full output of the power source to melting station 3 with either a 5000 or 10,000 lb furnace.

Melting station 4, now being installed will contain a 10,000-lb capacity furnace. Controls will permit application of the full 1250 kw generator output to the furnace for rapid melting.

Mold making is one of the most difficult operations faced in producing the huge centrifugal castings . . .

Or, to increase melting capacity to 20,000 lb, stations 3 and 4 can be powered simultaneously, each drawing 625 kw. Furnaces can be used for melting both ferrous and nonferrous alloys without making significant changes in the controls.

Another 1250-kw generator will be installed along with additional 10,000-lb furnaces for stations 5 and 6. The controls for this equipment will be arranged to permit simultaneous operation of any two of the large furnaces at stations 3, 4, 5, and 6. Provision will be made for operating three stations of this group at 835 kw each



RAMMING operation is being completed on two large cores. On the large diameter cores the men are lowered into the core and rise with fixture as job progresses.

or four stations at 625 kw each. This arrangement will permit making one 40,000-lb casting. For rapid melting, controls will be arranged to permit applying 1800 kw to any one of stations 3, 4, 5 or 6.

The foundry is divided into two sections. The section making large castings is a specialty job shop having several 14,000 lb oil-fired rotary melting furnaces and three high-frequency induction melting furnaces. When the change-over to induction melting is complete only two of the present oil-fired furnaces will remain. The management feels that for nonferrous melting alone, the present oil fired furnaces are adequate and that quality, economy, ease of control and operation of such equipment is entirely satisfactory.

Use special rammed sand liner

Small centrifugal castings are made in the second foundry section. This section has ten 600-lb capacity crucible type oil-fired furnaces and four of the same type furnaces of 175-lb capacity.

The main foundry uses four horizontal machines which produce castings up to 328 in. long. One vertical machine can produce castings 72 in. in diam and 25 in. long. The small casting machines have a size range from 33 to 18 in. in diam and to 69 in. long and one vertical machine 20 in. in diam and to 14 in. long.

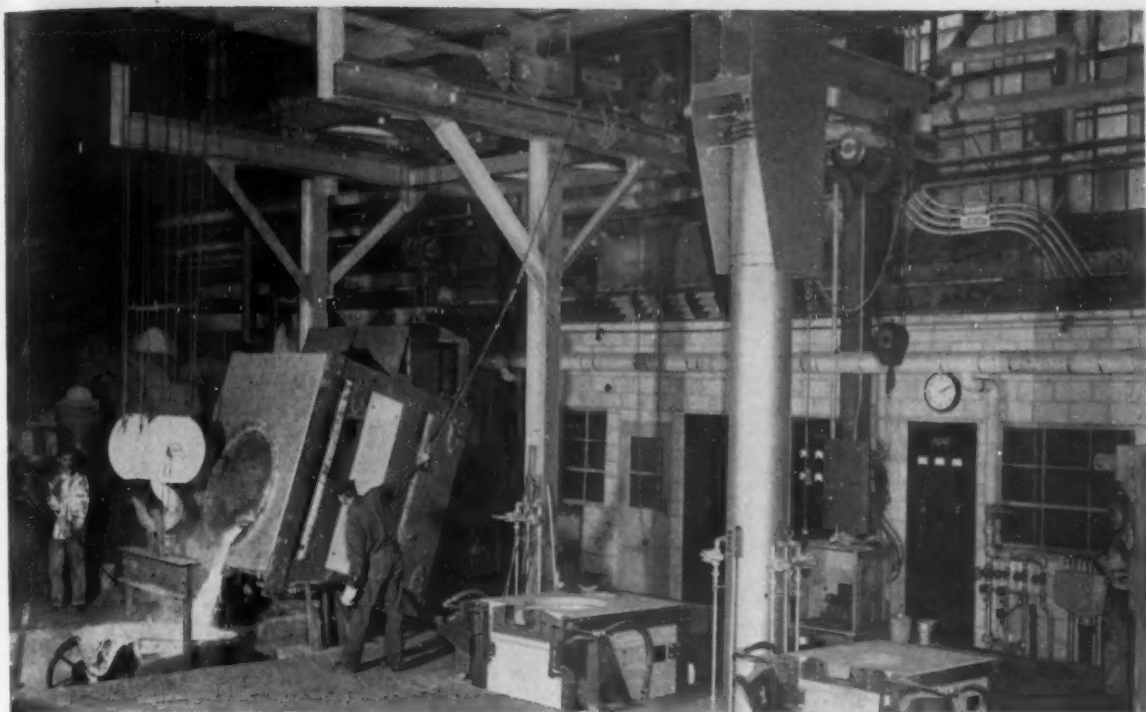
Mold making is one of the most important and difficult operations involved in producing the huge centrifugal castings made at this plant. For the smaller sizes the usual practice is to use permanent molds of carbon which line the inside of the core cases or flask. Hundreds of castings can be made from these permanent type liners. In the larger sizes, however, because of the individuality of the orders and their size it is necessary to use a special rammed sand for the liner. In some cases where the casting is of large diameter and comparatively short length and requires more than one piece the lining may be made up of strips of carbon fitted into the sides of the core case.

Dried with forced hot air

The problem of making a sand lining for the large and long castings has been solved by setting the core case on end vertically in a framework that holds it firmly in place. A plug 30 in. high and of the same diameter as the rough casting to be made is positioned in the core case. This is centered at the bottom and top around which the sand lining is rammed.

After the length of the plug has been rammed the plug is retracted a few inches and sand is then tamped into the area between plug and core case. This operation is repeated until the whole length of the core case is lined with a sand wall of uniform thickness.

The core case with the sand wall is then removed and placed in a verticle oil-fired drying oven over 30 ft high. Hot air is circulated through the oven and core case to dry the sand.



TAPPING a 10,000-lb high frequency induction furnace. The two smaller units are one 500 lb

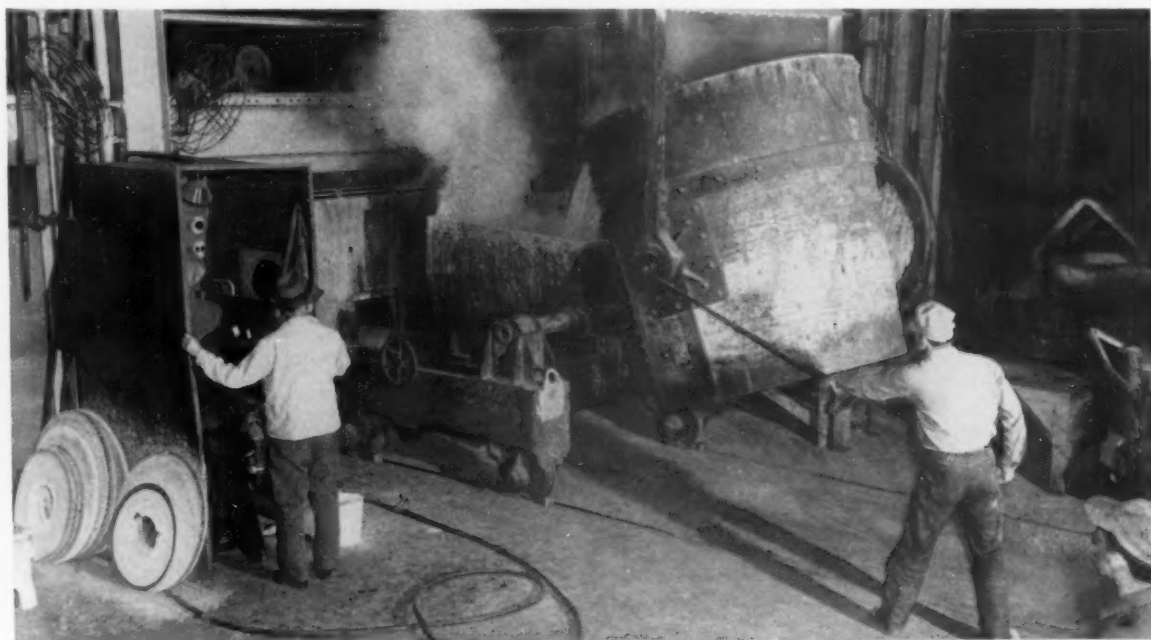
and one 1000 or 2000 lb depending on the crucible. Hydraulically operated floor forms pit.

This is an overnight procedure and results in a hard core that will withstand the spinning and the action of the molten metal.

The core case is then placed in the casting machine. Within limits, castings of any given diameter and length can be cast in the same size core case. The diameter can be varied slightly by varying the thickness of the sand wall. Casting length can be varied within the length of the

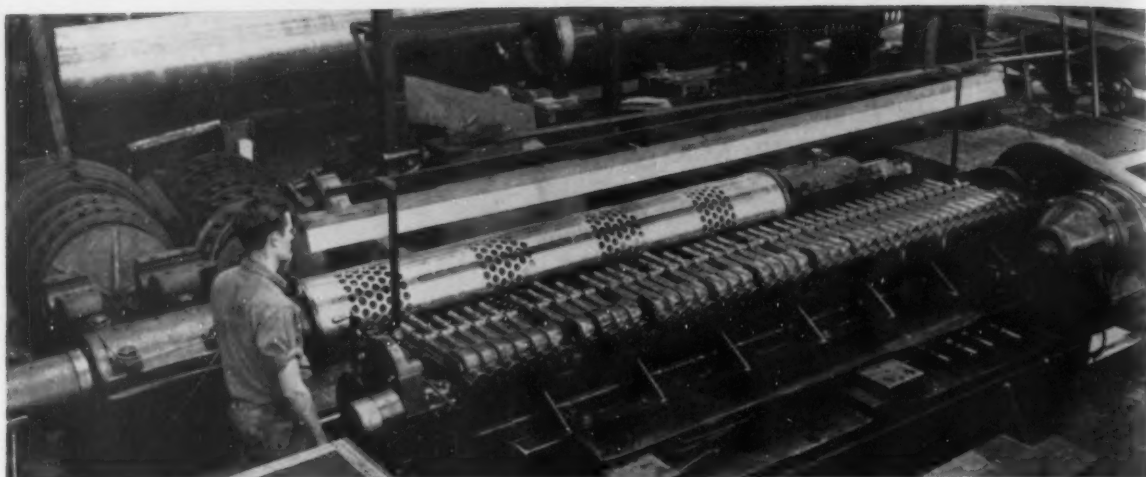
core case by using stop-off devices when required.

The complete casting operation is strictly controlled from a modern metallurgical laboratory. Control starts with purchase and selection of raw material and continues through charging and melting. Pouring temperature, speed of pour, the length of pouring time and speed of cooling are also specified by the Metallurgical Dept. Close control is maintained throughout;



POURING a 60,000 lb casting of nonferrous material into the centrifugal casting machine.

The machine is kept rotating at constant speed. Metal must be poured within an allotted time.



EXACT SPACING of holes is only one of the requirements of many of the castings at this

plant. Machine is automatic except for start and stop on each row of holes.

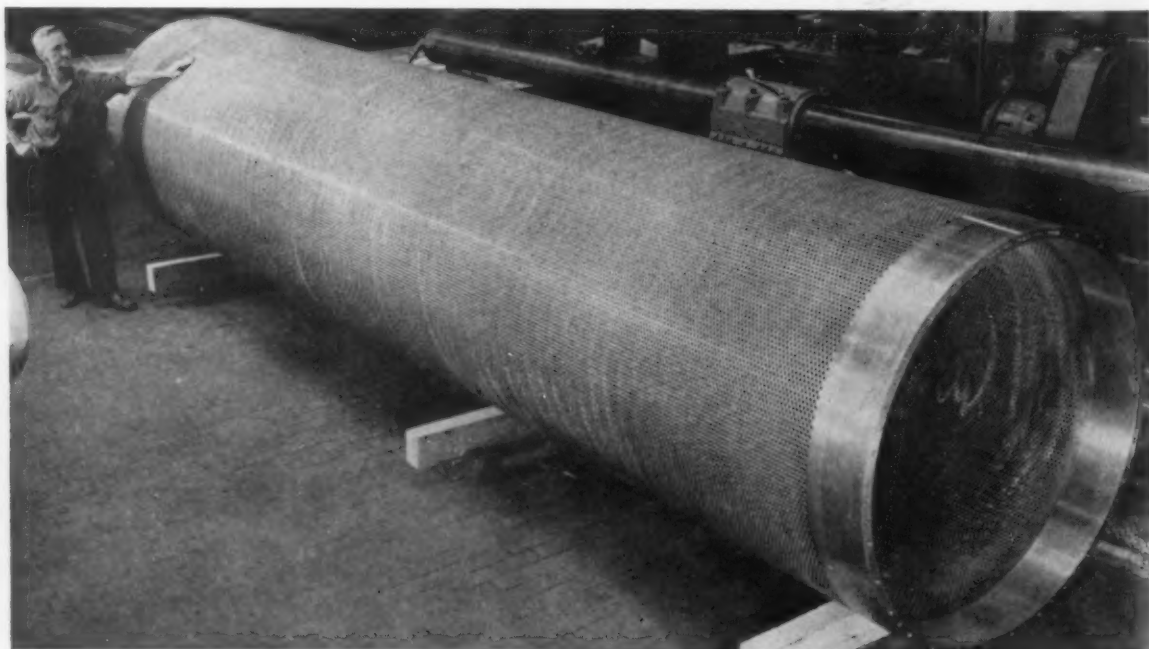
a process sheet is prepared for each new casting order and accompanies the order from the charging of raw material to transfer of parts to the shipping department.

Casting procedure, closely controlled by stopwatch requires a well trained team of operators. As soon as the heat is properly melted it is tapped into a ladle. The ladle is then taken to the casting machine and held until the temperature observer okays the temperature. In the meantime, dross is skimmed off and the metal is ready to pour into the casting machine which has already been brought up to required speed. While metal is being poured, the timer signals elapsed time so the ladleman may better control the running of the metal.

The complete cast is poured within the time specified for the particular casting. The cast-

ing machine continues to spin until the cast metal is cooled to a predetermined temperature at which time the machine is slowed down but not stopped. Due to the large amount of heat enclosed in the core case there is a constant problem of overheating the machine beyond the danger point. To overcome this water is sprayed over the outside of the revolving core case.

After the machine has slowed down a stream of water is sprayed through the inside of the casting until it has cooled sufficiently to be beyond danger of overheating the core case. The cooling is watched closely, and the water is sprayed uniformly over the inside surface to prevent nonuniform cooling. The usual time from pour to complete cooling of a 60,000 lb casting is from 2 to 3 hours depending on the composition and cross-section of the casting.



THOUSANDS OF SMALL holes must be drilled in some of the large centrifugal castings. These

are also deburred on the I.D. The casting often is rubber covered then redrilled.

Improved Quench Methods Developed for Austempering, Martempering

Heat treatment by austempering or martempering offers significant production advantages . . . Increased control of physical properties and more uniform as well as higher hardness may be obtained . . . Distortion is minimized and cracking is eliminated.

Application of these methods to specific production problems requires an understanding of the metallurgy involved and of factors governing the operations . . . Essential to their success is equipment tailored to the needs of these processes.

By **Q. D. Mehrkam**, Chief Metallurgist, Ajax Electric Co., Inc., Philadelphia

♦ **AUSTEMPERING AND MARTEMPERING** have provided industry with highly effective heat treating methods for obtaining optimum physical properties in many carbon and alloy steels. Ability to achieve maximum toughness and/or hardness with only negligible distortion, and without cracking, has proved of great economic value.

Both austempering and martempering resulted from increased understanding of the isothermal transformation of austenite to other structures. Their advantages are outlined in the table on page 100. The application of these treatments to specific production problems, however, requires understanding of the metallurgy involved, close control of operating factors, and equipment tailored to the needs of these processes.

In an isothermal transformation austenite is transformed to ferrite or a ferrite carbide aggregate (pearlite carbide) at a constant temperature within the transformation range.

The isothermal quench provides a cooling rate past the nose of the "S" curve, see p. 100, to avoid transformation to the high temperature products without cracking the steel. Distortion is usually negligible and optimum physical properties are obtained. Fig. 1 compares the dimensional changes between oil quenched and salt quenched Navy distortion rings. The salt quenched specimen has less distortion in every measurement. Parts can be finish machined before heat treatment, saving costly machining and grinding after hardening. Growth and distortion are more uniform and allowances can be made in machining prior to heat treatment. Thermal and transformational stresses are minimized.

The decision to use either austempering or

martempering will depend on the type of steel, section size, and the desired physical properties.

Straight carbon steels normally water quenched and having relatively low hardenabilities are the only steels which require special attention. In sections less than $\frac{3}{8}$ in. thick these steels respond favorably to an isothermal quench. The oil quenching or air cooling steels present no problem in hardening since the quenching severity of an isothermal salt bath quench furnace will produce equal if not superior results. If the steel section can be oil quenched to a satisfactory hardness, it can be isothermally quenched equally as well.

Martempering can be applied to any isothermal quench job. Austempering is usually confined to those steels responding to a hardness range of RC 35 to 54. For example, a carburized gear is martempered to a hardness of RC 61 to 62 (beyond the range of austempering) but a lawnmower blade is austempered to RC 52 to 54. The lawnmower blade would not be a good martempering application because the final structure would be martensitic, whereas, the bainitic structure of austempering produces a superior toughness.

Martempering involves: (1) Austenitizing the steel or cast iron to dissolve the constituents. (2) Isothermally quenching into a salt bath slightly above or below the M_s point until the temperature is equalized throughout. (3) Air cooling the material to room temperature. The resulting product of martensite is obtained under conditions of low thermal and transformational stress due to the small temperature differential between the surface and center.

Martempering, combined with carburizing can help minimize distortion in hardening . . .

Austempering, like martempering, requires that the steel or cast iron be austenitized and then quenched into a salt bath at a temperature above the M_s point, but held until transformation of austenite to bainite is complete. The steel is then either air-cooled or water-quenched. An austempering cycle can either be a "two-step" or a "three-step" (modified austempering) cycle.

Usually, the "two-step" method will accommodate most applications. However, this two-step method can be modified by using a lower quench temperature and then transferring the work immediately to a draw furnace (operating at a higher temperature) to complete the transformation to higher temperature bainite. Austempering is thus completed within the shortest possible time. Basic advantage of the three-step method is that it uses the high quenching power

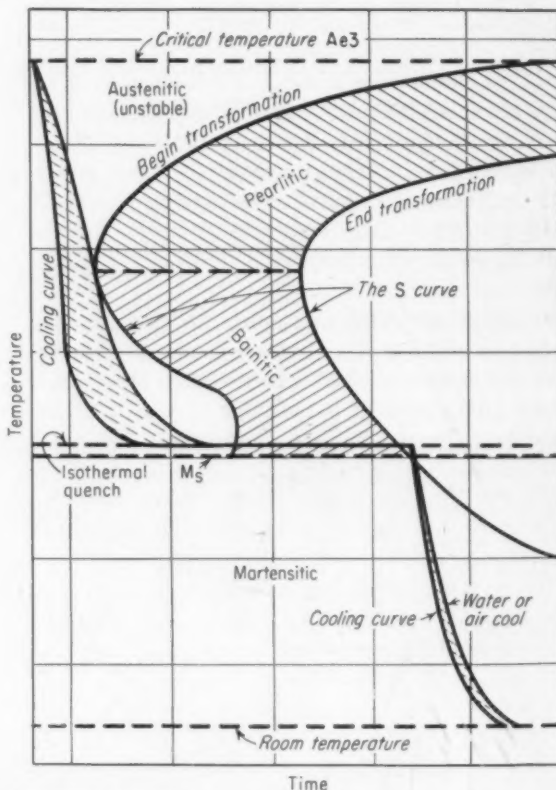
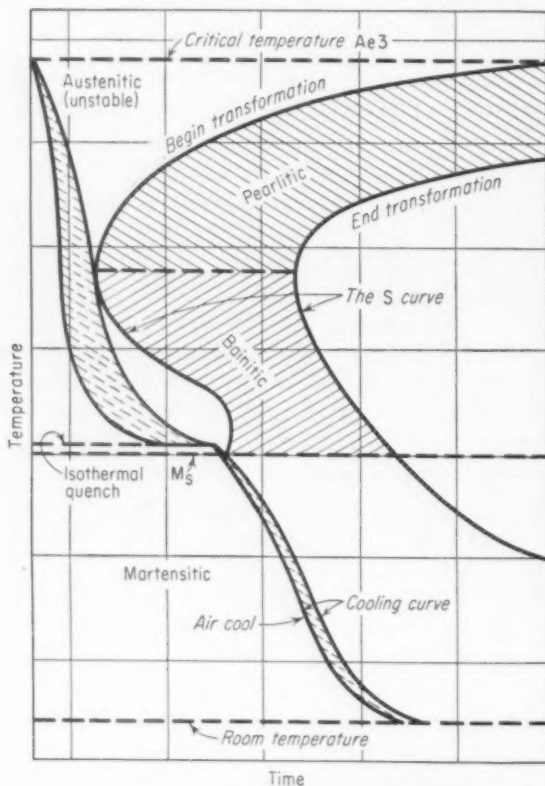
THESE ARE THE ADVANTAGES

Higher, More Uniform Hardness Is Attained
Distortion Is Negligible
Quench Cracks Are Eliminated
Scale or Decarburization Are Eliminated
Toughness and Ductility Are Increased
Process Easily Mechanized

of a low temperature quench and yet transforms the work to a tough bainitic structure of the required hardness.

Since austempering involves low thermal and transformational stresses it similarly minimizes distortion since bainitic transformational stress is even less than that of martensite. Cracking is also eliminated. The bainitic structure is tougher than an equivalent hardness obtained by quenching and tempering martensite.

Martempering, when combined with carburizing is of considerable advantage in minimizing the amount of distortion which would occur in conventional hardening. In carburizing steel, it



AUSTENITE AND THE "S" CURVE

Austenite is stable above the A_{e-3} temperature as indicated in the typical S or time-temperature-transformation curves shown above. But if held at a given temperature below the A_{e-3} critical, for the time indicated by the curve, austenite will transform to the microstructure characteristic of that temperature level.

The S curve, essentially two curves, shows the beginning and the end of transformation. Hardness resulting from complete transformation at a given temperature can be determined at any temperature level on the curve at the right. The M_s point indicates the temperature at which martensite begins to transform, and the M_f point indicates

the temperature at which martensite is completely transformed.

The S curve is valuable in determining: (1) The rate of cooling required to avoid passing through the nose of the curve; (2) the time required to obtain a desired structure; (3) the temperature at which the structure is obtained.

Shape of the S curve depends upon steel chemistry, austenitizing temperature and time, grain size, rate of cooling. These factors affect the displacement of the curve and the M_s point. The general effect of carbon and most alloying elements is to move the curve to the right, and lower the M_s temperature.

is necessary to consider the large difference which sometimes occurs in the M_s points of both the carburized case and the core. This becomes increasingly apparent with higher hardenability steels which involve higher degrees of transformation stress. In selecting a martempering temperature, a compromise is made between the M_s point of the case and the core without jeopardizing the hardness of the case. The quenching temperature range is usually within 400° to 500°F.

An austempering treatment usually involves less total time of heat treatment. This is extremely important in mechanized lines where space is at a premium.

Sufficient data is available from which approximate time and temperature cycles can be selected. However, transformation data are not precise due to variations from heat to heat in chemistry, grain size, austenitizing temperature, mass, and isothermal cooling conditions. By trial runs, the final cycle is often determined.

A common method used in determining the extent of isothermal transformation is to hold the steel specimens at the transformation tempera-

ture for various periods of time and then quench into water. The change in hardness serves as a clue to the completion of transformation.

The more laborious metallographic technique involves considerable time and expenditure to determine the completion of transformation by the study of the steel microstructure. Although used to a great extent, the hardness and metallographic techniques fail to determine accurately the end of bainitic transformation and this may lead to lower physical properties of the steel than are inherent.

The most recent technique for determining transformation time uses the Schaaber Dilatometer, Figs. 2 and 3, which measures the change in volume of steel undergoing isothermal transformation. The Dilatometer is capable of measuring to 0.001 mm and to evaluate to 0.0001 mm changes in length caused by the transformation from austenite to structures such as pearlite, bainite, and martensite.

Steel specimens in the same section as the part are austenitized and then isothermally quenched in the same manner in which the ultimate austempering cycle will be used in commer-

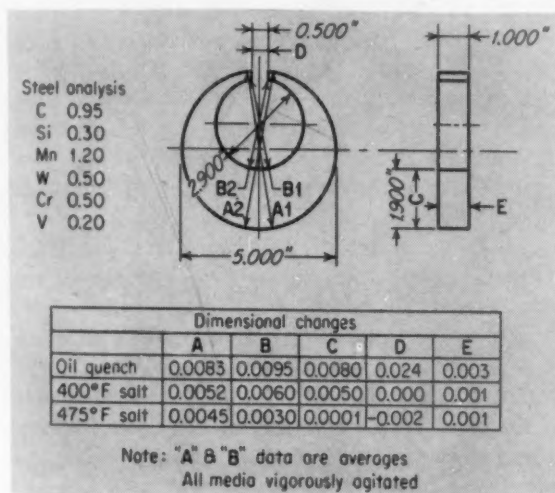


FIG. 1—Effect of quenching media on dimensional stability of C type Navy test ring.

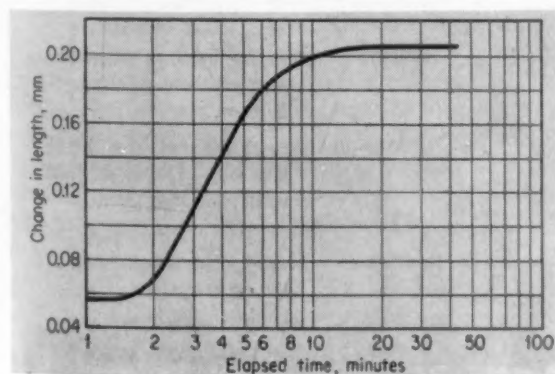


FIG. 3—Dilatometer curve of isothermal transformation of steel (0.89 pct C, 1.28 pct Cr) austempered at 600°F. Completed in 20 minutes.

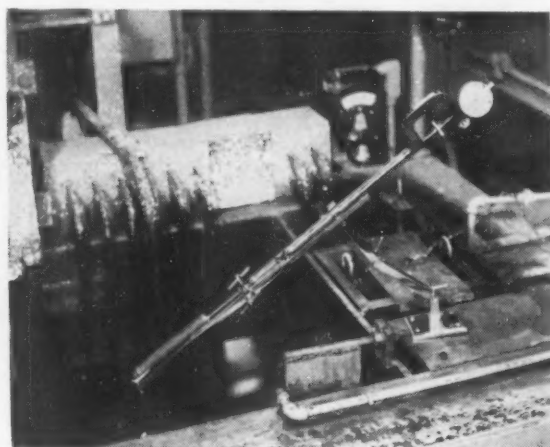


FIG. 2—Austenitized steel specimen mounted in Dilatometer prior to immersion in salt quench.

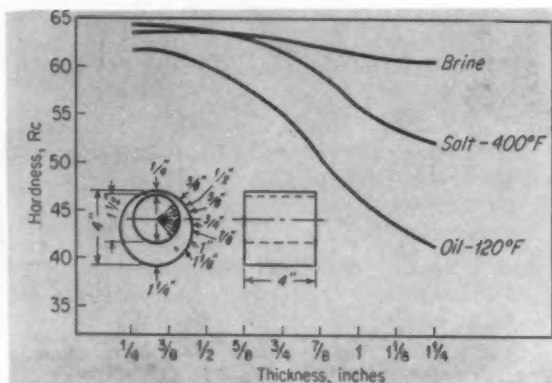


FIG. 4—Influence of quench media in hardening SAE 52100 compares brine, salt and oil. Courtesy Brown & Sharpe Mfg. Co.

cial application. The Dilatometer measures accurately and quickly the dimensional change which takes place in the length of the specimen. When no further change is noted, transformation is complete and the time required for the isothermal quench is obtained.

Both austempering and martempering consist of two primary phases—(1) austenitizing (heating the metal to cause the constituents to go into stable solution), and (2) quenching. Each phase requires equipment specifically designed for that operation, and the success of any installation depends upon the correct choice, design and operation of the equipment.

In austenitizing, rapid, uniform heating is desirable to bring the work up to temperature evenly (thus avoiding overheated spots in the work), and to cut processing time to a minimum. And since control of distortion is vital throughout the austempering or martempering processes, it is equally advantageous to hold distortion to any absolute minimum during the austenitizing period. Salt bath furnaces, with their attendant high heating rates and uniform temperature distribution characteristics, are preferred for the austenitizing phase of the process.

It is also necessary to avoid scale or decarburization. For this reason, molten baths of neutral chloride salts are ideal since they exclude oxidation of the work during heating, and during transfer of the work from the austenitizing bath to the quench bath. The harmful effect of scale and oxide during quenching is eliminated.

In quenching, salt bath furnaces again prove to be the ideal medium. Suitably agitated molten salt is superior to mineral oils at temperatures of 350°F and above because the salt has greater quenching power. In time the oils break down and carbonize with resulting sludging problems. Also, the high volatility of oils at high temperatures presents a safety hazard.

Basic design problem in engineering an isothermal quench furnace was to provide a quenching severity that would avoid high temperature

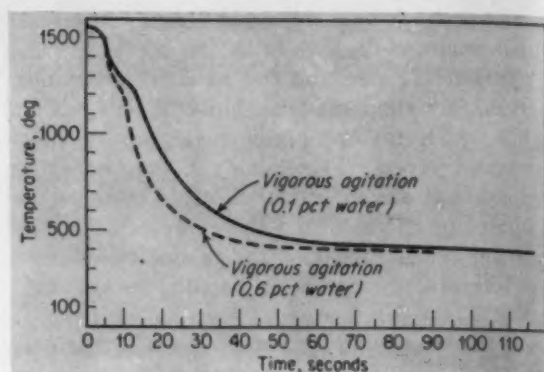


FIG. 5—Effect of water addition to a nitrate-nitrite salt (containing 4 pct chlorides at 400° F) on the center cooling rate of a 1 in. diam by 4 in. long bar of SAE 1045 steel.

transformation products by providing the critical cooling rate which had to be met or exceeded throughout the cross-section of the work. Ajax Electric Co. engineers recently perfected a new type of quench furnace. The Cataract Quench furnace has unusual quenching power. A uniform yet high velocity downward flow of salt within a header gives molten salt (400°F and above) quenching power that surpasses or equals that of agitated oil (100° to 150° F) Fig. 4. A salt pump, which can be operated over a wide range of speeds, is used to withdraw salt from the bottom of the header and deposit it back into the furnace—providing effective agitation through the furnace.

Maximum agitation is the primary means of increasing quenching rate. One of the more recent discoveries is the effect of the water addition to molten nitrate-nitrite salt. The addition of a small amount of water increases the quenching power, Fig. 5, and lowers the melting point of the salt. Water addition should be considered when other methods fail to provide adequate quenching power.

SOME TYPICAL AUSTEMPERED OR MARTEMPERED PARTS

PART	MATERIAL	PROBLEM	TREATMENT	HARDNESS	REMARKS
Lawnmower Blade	SAE-1065	To obtain toughness with moderate hardness.	Austemper	Rc 48-52	Can be bent to horseshoe shape without cracking. Will cut nails.
Electric Shaver Head 0.003 in. gage slotted pieces	High carbon vanadium steel	To eliminate rejects.	Austemper	R15N 86-88	Rejects reduced from 3.6 to 0.05 pct. Distortion held within specified limits.
Bearing Races 8 $\frac{3}{8}$ in. OD 7 $\frac{1}{2}$ in. ID 5 $\frac{1}{8}$ in. wall	SAE-52100	To reduce distortion, eliminate cracking.	Martemper	Rc 63-64	Average growth held to 0.003 in. Average out of round held to 0.007 in.
Rocket Bodies	SAE-4140	Hold distortion to 0.0015 to 0.002 in.	Modified Austemper	Rc 34-39	Quench at lower than normal temperature, then draw at higher temperature. All machining completed before austemper.

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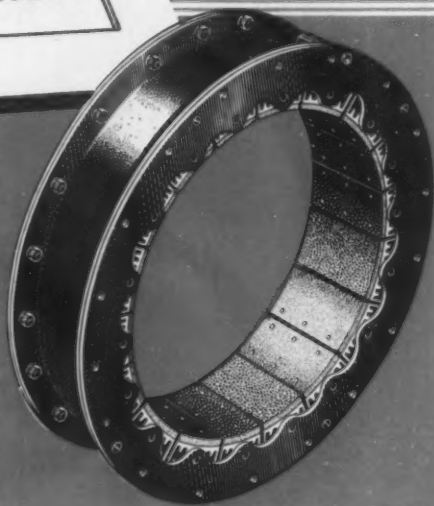
FAWICK TYPE EB
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FAWICK Power-Transmission Products

FAWICK TYPE E
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FAWICK TYPE VC
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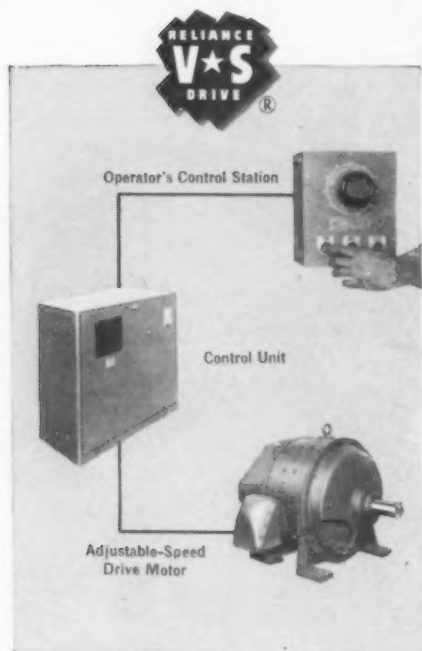
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New Technical Literature:

Utiliscope

Diamond Utiliscope, or wired television, is discussed in this new booklet. Among the advantages of Utiliscope listed are centralized control, safety, quality control, cost reduction and visual control. Stressed is the fact that the Utiliscope can be where it is too dangerous, difficult, expensive or inconvenient for workmen to be. *Diamond Power Specialty Corp.*

For free copy circle No. 1 on postcard, p. 109.

Balancing equipment

One of the new Beko Balancer series of nine heavy duty, general purpose, static and dynamic balancing machines is discussed in this booklet. These machines are for small and medium size rotors. Stressed is the machine's simplicity of operation, and its ease of use by unskilled operators. Specifications are given. *Balance Engineering Co.*

For free copy circle No. 2 on postcard, p. 109.

Catalog sheet

The Rowe adjustable ramp for loading docks is covered in this catalog sheet. Discussed are the push-button control, the manual floating feature, the floating arms, and the float control selector. Pictures and drawings give more information. Operating and design features, and specifications are given. *Rowe Methods, Inc.*

For free copy circle No. 3 on postcard, p. 109.

Bonding mortars

Two types of high temperature, cold-setting bonding mortars, Harwaco Bond and Thermolith, are described in these bulletins. Harwaco Bond's properties include high refractoriness and non-shrinking characteristics. Thermolith is especially suited for use with the basic refractories. Outstanding features of both products are listed. *Harbison-Walker Refractories Co.*

For free copy circle No. 4 on postcard, p. 109.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 109.

New alloy

A new high temperature alloy, NA22H, is the topic of this folder. Various uses of the alloy, which will withstand operating temperatures of up to 2200°F are described in this folder. *National Alloy Div., Blaw-Knox Co.*

For free copy circle No. 5 on postcard, p. 109.

Billet conditioning

The Continental Continuous System for billet conditioning is discussed in this new bulletin. On-the-job pictures show this system for continuous mechanical billet conditioning at work. Advantages of this system are discussed. Accessory equipment is shown. *Continental Foundry & Machine Co.*

For free copy circle No. 6 on postcard, p. 109.

Fire extinguishers

A handy one-pint Pyrene fire extinguisher is featured in this new bulletin. The extinguisher is push-button operated. It has been especially designed for the home, automobile, camp, or small boat. *Pyrene Manufacturing Co.*

For free copy circle No. 7 on postcard, p. 109.

Conveyor belts

Conveyor belts for heat-treat furnaces are covered in this new bulletin. The manufacture and testing of general purpose belts and one heavy-duty service belt are described. *Electro-Alloys Div.*

For free copy circle No. 8 on postcard, p. 109.

Catalogs & Bulletins

Toggle switches

Three position toggle switches are discussed in this data sheet. Among the features listed are compact design, improved detent action, and positively driven switch actuating levers. Toggle positions are discussed. Electrical rating information is given. Specifications are included. *Micro Switch Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 9 on postcard, p. 109.

Neoprene notebook

How the rubber industry runs its tests and what the test results mean is the topic of this new bulletin. The bulletin compares liquid neoprene coatings to other paints used on the "splash" area of acid tank trucks. Other products featured are the centrifugal pump, levelling mount and cleat conveyor belt. *Rubber Chemicals Div., E. I. du Pont de Nemours & Co. Inc.*

For free copy circle No. 10 on postcard, p. 109.

Epoxy resins

Bakelite C-8 epoxy resins are discussed in three folders. These resins with the proper hardeners can be used in tooling, casting, laminating, potting, encapsulating, embedding, and adhesive applications. Data are given on the physical properties of individual resins and hardeners. *Bakelite Co., Union Carbide & Carbon Corp.*

For free copy circle No. 11 on postcard, p. 109.

Vape-Sorber

The Selas Vape-Sorber is discussed in this new bulletin. The Vape-Sorber provides continuous removal of petroleum vapors, dirt and liquids from air and gases. Processes served include liquid aerations and agitations, compressed air for drying and cleaning instruments and pneumatically-operated mechanisms. *Selas Corp. of America.*

For free copy circle No. 12 on postcard, p. 109.

Turn Page

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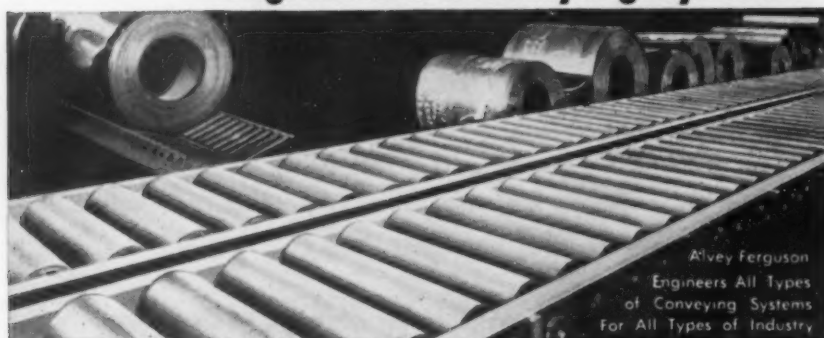


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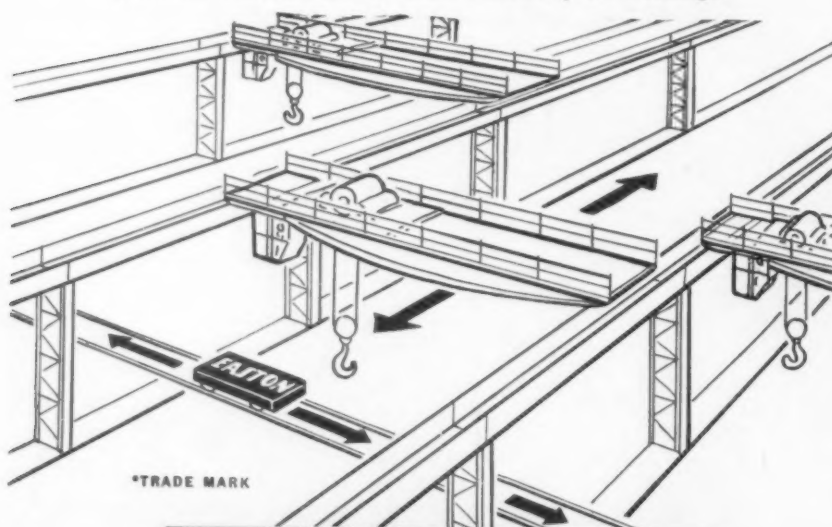


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FREE TECHNICAL LITERATURE

Gunchrome-M

Gunchrome-M, a chrome-magnesia
base refractory designed for gun
emplacement, is discussed in this
booklet. Gunchrome-M is used for
maintenance of critical areas in
open hearth and electric steel-mak-
ing furnaces, and soaking pits. The
illustrated booklet outlines the ad-
vantages and uses of this product.
Basic Refractories, Inc.

For free copy circle No. 13 on postcard, p. 109.

Respirator

A new Chemical Cartridge Respira-
tor with an "All-Vision" facepiece
is described in this bulletin. The
respirator is pictured and its ad-
vantages are pointed out. Among
advantages mentioned are its ad-
justable headstraps, shatterproof
lenses, exhalation valves, and rub-
ber body. *Mine Safety Appliances
Co.*

For free copy circle No. 14 on postcard, p. 109.

Transmission belt

Poly-V drive, a new concept of belt
power transmission, is described in
this illustrated brochure. Design
characteristics of the single, endless
belt with molded lengthwise ribs,
are explained. Advantages of the
drive are listed. *Manhattan Rubber
Div.*

For free copy circle No. 15 on postcard, p. 109.

Grinding machines

The Bridgeport line of grinding
machinery and the Bridgeport line
of "ABRASAW" abrasive cut-off
machines are covered in two bulle-
tins. Illustrations, specifications,
and features of the complete range
of sizes are included. *Lobdell
United Co.*

For free copy circle No. 16 on postcard, p. 109.

Gear motor reducers

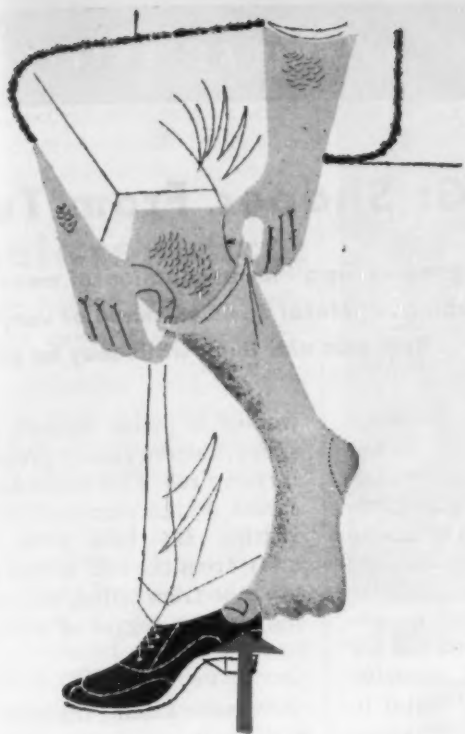
Gear motor reducers are covered
in this catalog. These motor reduc-
ers have horizontal or vertical
drive. The ratio ranges from 10:1
to 1200:1 and from ¾ to 75 hp.
Rating tables, dimensions and
prices are also included. *D. O.
James Gear Mfg. Co.*

For free copy circle No. 17 on postcard, p. 109.

Turn Page

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a hole here is a nuisance...



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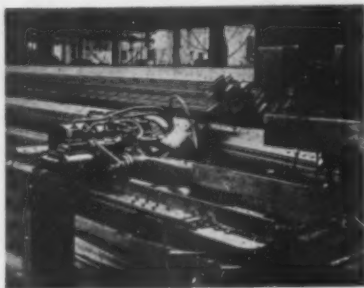
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TECHNICAL BRIEFS

FORMING: Shapes From Tubes

Modified spinning process simplifies production of many shaped parts from aluminum tubing . . . Metal flows to shape of varying contour . . . Both thin and thick walls may be produced.

A recently developed manufacturing technique known as the Dewey Process makes possible the production of regular, circular configurations out of a single piece of tubing in aluminum or other metals. The manufacture of unusual tubular shapes has been regarded as uneconomical because it involved the separate production and assembly of two or more pieces of metal to produce the shape desired. The new process is reported to make possible mass production of configured aluminum tubing.

Advantages of the process, described in a recent issue of *Aluminum News*, are apparent in the design and manufacture of such items as conveyor rolls, vari-shaped lighting standards, bobbins for the textile industry, and other tubular products.

Tube Is Rotated

Basically, the process is a modified spinning process similar to that used in the manufacture of aluminum pots and other utensils. The machinery works a straight piece of cold tubing so that the metal flows to a shape of varying contour. The entire configuration operation is usually completed in one pass. The tube is rotated and pulled through a forming unit by a chuck mounted in a sliding headstock. A template is attached in a manner which maintains a constant relation between chuck and template.

As the forming roll works into the tube, the section about to be

worked is pulled through a sliding support sleeve closely preceding the forming roll. This sleeve assures accurate design reproduction by preventing the tube from bending away from the roll. It also prevents the tube from bellling out, maintaining an even degree of working.

Process in Multiples

To some extent, the type of spinning roll used determines wall thickness. Also, with both ends fastened in chucks, the tube can be loaded in tension, which produces a thin wall. A thick wall can be produced by loading in compression.

The process is especially advantageous where items such as conveyor rollers are being configured, as they can be processed in multiples or on one long length of tubing. Multiples can subsequently be cut into individual lengths.

Radius control is effected by the shape of the template face. Increase or decrease in the tube diameter can be effected by a change in direction on the template, and it is this change which gives rise to a change in the shape of the tube.

It is evident that this creates a new arc finding its center at the point of the angle so formed. The radius at the top of the taper, formed by the natural flow of the metal, varies according to gauge and material. At the lower end, the radius equals that of the cam follower roll plus the radius on the face of the forming roll.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 109. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Wherever possible, it is preferable to limit degree of taper to 15°. Angles producing sharp corners or ridges are not possible, while abrupt changes in profile result in equally abrupt changes in stress.

Maintenance:

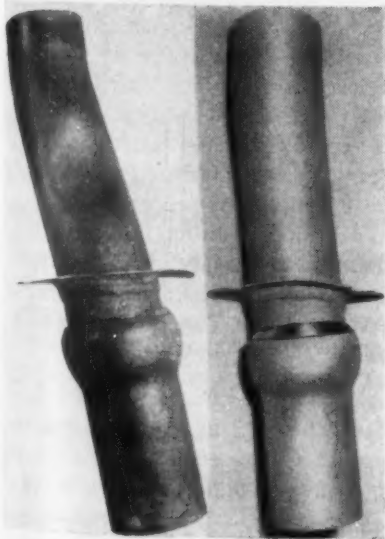
New method used to repair aircraft exhaust components.

Joint assemblies used to connect engine ports with exhaust collector rings, previously scrapped after each engine run, can now be rehabilitated at about 50 pct of original replacement cost. The successful repair method was worked out by Ledkote Products Co., Long Island City, N. Y. Inventory problems are lessened, since the production repair service can process and return parts within one week.

A typical installation on a DC-4 exhaust system contains three types of universal ball joint assemblies. Engine vibration and exhaust corrosion pitted the outer ball surface.

Stripped and Refinished

Replacement was necessary until an economical method of rehabilitating assemblies was developed by Ledkote's Aircraft Div. In the process the ball joint is stripped and corrosive scale is removed. Spherical surfaces of the ball component are refinished. A new high-temperature, corrosion-resistant, stainless steel sleeve assembly is installed.



Before and after . . .

October 28, 1954

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- ☐ Do the gears you use have surface-hardened teeth?
- ☐ Are the cores tough, ductile, and shock-resistant?
- ☐ Do they always fit perfectly and require no run-in?
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- ☐ Are you completely satisfied with them?

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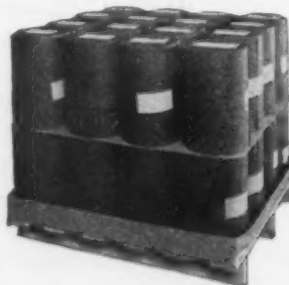
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Formerly rolls of polyethylene sheeting were shipped in lots of 32 rolls—packed two to the carton. That meant 16 cartons, and 16 handlings all along the line to the consignee.

Signode Engineers devised a basic pallet-pack that put all 32 rolls of polyethylene in ONE unitized pack! This new strap-secured method of packaging saved the shipper \$2.80 in packaging and handling costs per pallet!

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New Books:

"SAE Manual on Blast Cleaning," compiled and edited by the Blast-Cleaning Committee of Division XX of the Iron and Steel Technical Committee, contains specific advice concerning the blast-cleaning process. Included is data on blasting machines, blasting abrasives, recommended cleaning practices, production procedures, inspection, shot and grit specifications, etc. SAE Special Publications Department, 29 West 39th Street, New York 18, N. Y. \$4.00.

"The Microscopy of Metals," produced by the Institution of Metallurgists, contains lectures delivered at the Refresher Course held in 1953. Topics discussed are: microscopes and microscopic techniques; general metallography; use of polarized light in metallography; hot stage microscopy and phase-contrast and interference metallography. The Institution of Metallurgists, 28 Victoria Street, London, S.W. 1. \$2.20. 132 p.

"Prospecting With a Counter" by R. J. Wright, is a U. S. Atomic Energy Commission booklet describing the use of radiation detection instruments in prospecting for uranium ores. A revised version of an earlier AEC report. U. S. Government Printing Office, Washington 25, D. C. \$.30. 68 p.

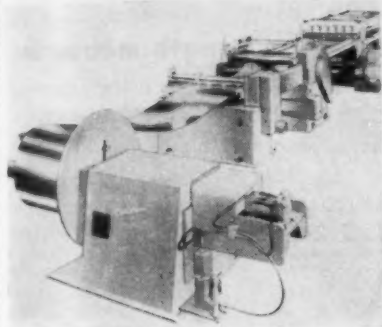
"Qualitative Inorganic Analysis" by G. Charlot integrates the physico-chemical approach into the teaching and practice of analysis. Book is divided into three sections. Part I describes general properties of compounds in solution and in contact with solvents, Part II deals with individual properties of ions and compounds and Part III gives details of analytical technique. John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York. \$7.00. 354 p.

"Methods of Reasoning," by P. D. Scott. Contains the entire approach to the scientific method in condensed form. Publications Office, Cleveland Engineering Society, 2136 E. 19th St., Cleveland 15, O. \$1.00. 15 p.

NEW EQUIPMENT

New and improved production ideas,
equipment, services and methods
described here offer production
economies... for more data
use the free postcard on page 109 or 110

Permits use of coiled instead of flat stock



Dahlstrom's Shear Line permits the use of coiled material instead of flat stock. It consists of hydraulic expandable mandrel coil reel, roll straightener with all rolls power driven, hump table, high speed shear, conveyor type measuring and take-off unit. Various operations are performed including decoiling, flattening, shearing and

measuring the metal to desired length. Steel or aluminum of 12 gage and lighter can be handled up to 72 in. wide. Lengths can be cut to specific requirements with tolerances of 1/32 in. A variable speed range gives from 50 to 150 fpm. Unit can edge trim also. *Dahlstrom Machine Works, Inc.*

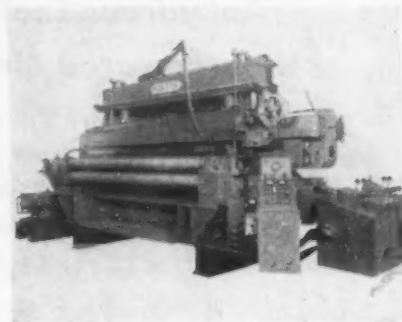
For more data circle No. 33 on postcard, p. 109.

Machine can weld and trim 10-ft long seams

The combined welder and trimmer includes essential features required for handling coil ends or flat sheets into position for submerged arc or gas shielded welding. It incorporates the time-saving feature of welding and trimming the weld bead from both sides, at one time, without unclamping or transferring the welded seam. It is ar-

ranged for welding and trimming 10-ft long seams in 1/16 to 1/4 in. stainless or other alloy sheets and strip. Pinch rolls are furnished, the top roll being hydraulically loaded for holding the sheet flat during welding and trimming operation. Water-cooled backup bar is supplied for welding. *Morton Mfg. Co.*

For more data circle No. 34 on postcard, p. 109.

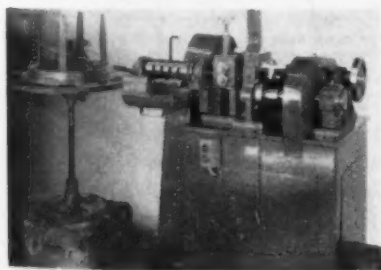


Pin machine rated at 18,000 to 75,000 per hour

A high speed pin machine will cut pins from 1/8 to 3/16 in. diam wire in lengths from 7/16 to 4 3/4 in. at from 18,000 to 75,000 per hr, holding lengths to ± 0.0025 . These pins are said to emerge with perfect ends, requiring no tumbling to remove burrs. The machine is driven

by a 3 hp electric motor. It has a straightening arbor to straighten the stock as it enters, and an adjustable micrometer stop for length. Changing from one size wire pin to another can be done in 10 min. *L. R. Brown Mfg. Co.*

For more data circle No. 35 on postcard, p. 109.



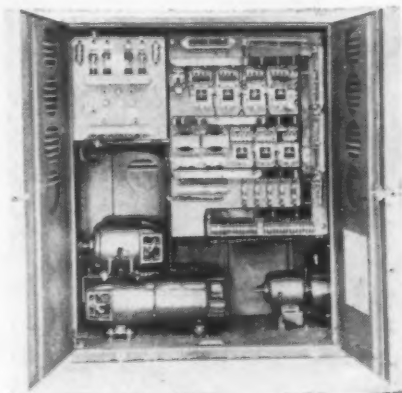
Improved wiring features drive control units

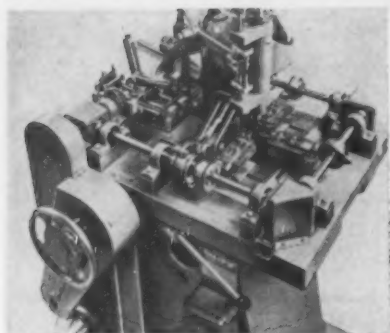
Channel wiring is a new design feature of the control units of Reliance all-electric adjustable-speed drives. The innovation involves two new approaches to basic principles: (1) leading the wires across the surface of the control panels through protective channels; (2) coding the wires, by number and color, and no longer showing the actual wires on the diagrams. The result is added protection for the

panel wiring, simplification of wiring diagrams, and easier alteration for possible future changes of drive functions. Maintenance time is reduced by the simplified wiring arrangement. The duct-like channels have perforated sides for the exit of each wire to its proper destination. *Reliance Electric & Engineering Co.*

For more data circle No. 36 on postcard, p. 109.

Turn Page





Spring winder provides ample room in which to work

A heavier torsion spring winder is capable of handling up to 10 turns of 0.080-in. wire. Its 12 x 18-in. tooling area provides sufficient room for faster setups, sturdier tools and enough space to keep the tools out of the way of swinging wire ends. Constant accuracy, increased machine life and reduced maintenance requirements

are made possible by the use of anti-friction bearings throughout the new winder. Driven by a motorized variable speed transmission and V-belt drive, the W-3001 is equipped with two slide feeds: one handles up to 3½-in. wire and the other feeds wire ranging up to 6¼ in. long. *Torrington Mfg. Co.*
For more data circle No. 37 on postcard, p. 109.

Cowles

DRYORTH*

Anhydrous Sodium Orthosilicate

High-powered Cleaning at Low Cost

• Cowles DRYORTH is free-flowing, granular, dust-free. It contains not less than 60% Na₂O and is quickly and completely soluble.

DRYORTH is a fast, economical cleaner for

- ★ strip and sheet steel
- ★ steel pipe—before galvanizing
- ★ heavy ferrous parts and castings

Try DRYORTH for these and other basic cleaning operations. DRYORTH—anhydrous sodium orthosilicate—assures long cleaning mileage at low cost.

*Reg. U. S. Pat. Off.

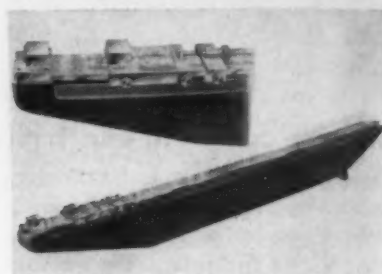
Cowles also manufactures a complete line of cleaners engineered to handle all kinds of cleaning problems on both ferrous and non-ferrous metals. The Cowles Technical Man in your area will be glad to discuss any metal cleaning problems you have. Write us today!

**COWLES
CHEMICAL
COMPANY**

7016 Euclid Avenue
Cleveland 3, Ohio

Length measuring

A simplified length measuring machine for external and internal measurements has a range up to 120 in. Reading is accomplished by means of steel scale and extra large vernier to 1/1000



in. and 1/50 mm. This over-size vernier is 2.450 in. long. Verniers for both inches and millimeters are adjustable. The measuring machine is used as a Master or Check, and for accurately setting large micrometers, snap gages, etc. *George Scherr Co., Inc.*

For more data circle No. 38 on postcard, p. 109.

Electrode wire

An activated electrode, mild steel wire has been developed for use in the Aircomatic process. The activation agents change the burn-off rate so that stable spray-type transfer can be obtained on dc straight polarity without the need for oxygen additions to the shielding gas. Because these agents modify the penetration pattern, other activated wires will find many uses in welded build-up applications requiring minimum base metal pickup. These wires permit the use of the process with standard ac welding power supplies; can be used on applications where severe arc blow conditions may have previously prevented its use. *Air Reduction Sales Co.*

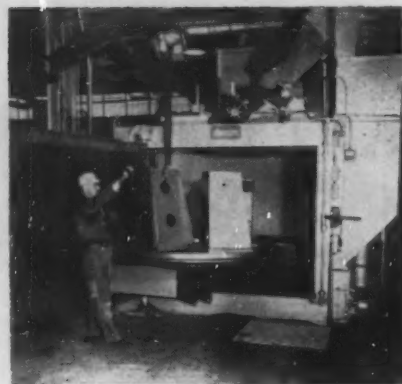
For more data circle No. 39 on postcard, p. 109.

Table-type blast cleaner requires no pit

Built for floor level installation, a table-type airless blasting machine for various cleaning and peening applications requires no pit for the abrasive hopper. The machine has a 40-in. work height clearance. Intended for cleaning castings, forgings, heat treated parts, weldments, or stampings, the table can hold either a few large pieces, or hundreds of small parts at one time.

A 72-in. diam plain work table is mounted on the door of the machine. When the door is opened, the work table comes out into the room for ease in loading and unloading. When the door is shut the table automatically moves into the blasting zone and rotates the work under the abrasive blasts. Blasting is automatic. *American Wheelabrator & Equipment Corp.*

For more data circle No. 40 on postcard, p. 109.

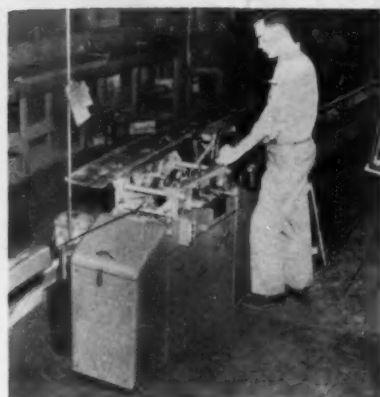


Straightening of small diameter stainless tubing

A compact Sutton straightener of new design has solved the problem of precision straightening of small diameter stainless steel tubing at J. Bishop & Co. The unit, listed as a Sutton Syncro-Drive Model 00, has a capacity of $\frac{1}{8}$ to $\frac{5}{8}$ in. OD tubes. It operates at straightening speeds from 60 to 300 fpm using a 2 hp variable speed drive. Setup time is fast with all adjustments easy to make. Operator visibility

is excellent and the machine features fall away scale disposal for clean operation. Automatic coordination between the drive for the two larger rolls and the drive for the three smaller pressure adjusting rolls make it possible to maintain relatively constant surface speeds between opposed rolls for better strightening and long roll life. *Sutton Engineering Co.*

For more data circle No. 41 on postcard, p. 109.



Automatic control of thickness of cold-rolled strip

For automatically controlling the thickness of cold-rolled strip a system known as the AccuRay process control consists of a welded steel radiation gage to signal sheet variations, a continuous recorder to present thickness readings, an automatic controller to interpret the signals and provide proper corrections to the screwdown motors. Safety devices insure maximum product and process protection. The operator's control station at

the mill contains a wide strip recorder and gage controls. Gage calibration automatically changes to range specified by a selector switch; no standard samples are required. Fabricated of half-inch steel plates, the AccuRay measuring unit retracts completely into the mill frame to permit easy access to mill rolls. Slide traversing may be pneumatic or hydraulic. *Industrial Nucleonics Corp.*

For more data circle No. 42 on postcard, p. 109.

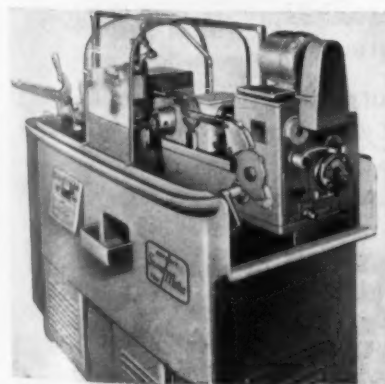


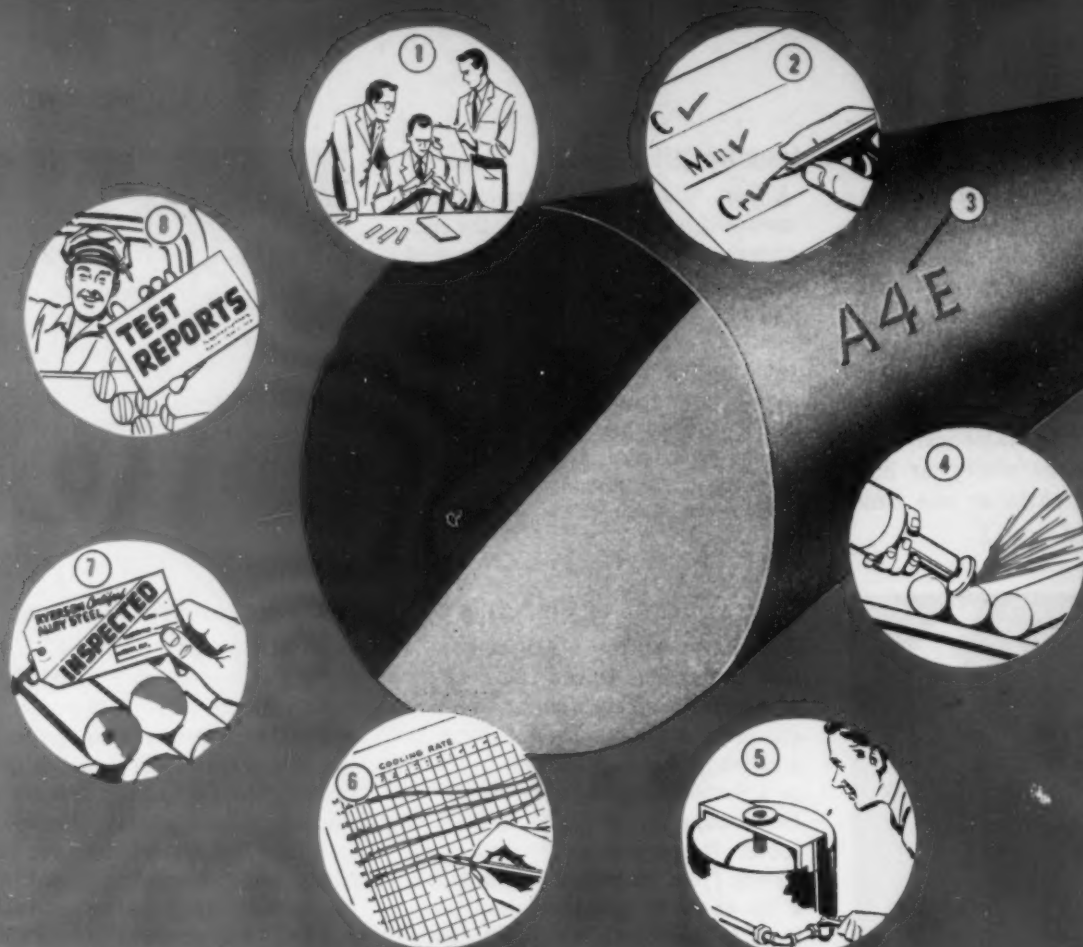
Three spindle speeds possible during any work cycle

On a new automatic single spindle screw machine, called the Screwmatic 750, an infinitely variable spindle speed drive has replaced gearing. This permits a maximum spindle speed of 5100 rpm with higher speeds available on request. Infinitely variable spindle drive permits a choice of three different spindle speeds during any work cycle. All speeds are controlled by a simple dial setting and are ad-

justable during actual cutting. Reversibility of all forward speeds eliminates need of left-hand tools. V-belt work spindle drive in place of roller chains is another design feature. Stock feeding is through low pressure air cylinders instead of a constant speed backshaft. Using standard size collets the machine takes bar stock to 0.750 in. diam. *Gear Grinding Machine Co.*

For more data circle No. 43 on postcard, p. 109.





How Ryerson 8-step quality control

Protects Your Alloy Purchase

Are you sure of the alloy steel you buy? Sure of type and quality—sure of what the steel will do?

When you call Ryerson for alloys you can be sure—because Ryerson, and only Ryerson, takes eight separate and distinct steps to protect you against the many slips that can occur before the steel you order reaches your plant.

First, to assure you alloys of highest quality, we carefully select each heat to be carried in Ryerson stock ¹—verify the analysis as soon as a heat is received. ² Next, for permanent identification, we stamp each bar with its particular heat symbol ³—color mark it according to type.

Then, to guard against mixed steels, we spark test every lift of bars from each heat. ⁴

Meanwhile, we test a sample of every heat for hardenability ⁵ and interpret the test results for you. ⁶ So, finally, when you call Ryerson for alloys you can be sure. Tested steel—racked separately by heats—is prepared to your order; given a final inspection ⁷ and rushed to your plant. And with your steel (as-rolled or annealed), you receive complete test data ⁸ to verify quality and guide heat treatment.

This 8-point quality protection is yours at no extra cost. Just call your nearby Ryerson plant.

Principal Products: Carbon, Alloy & Stainless Steels—Bars, Structurals, Plates, Sheets, Tubing, Machinery & Tools, Etc.

RYERSON STEEL



JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

Ingot rate advances for eighth consecutive week . . . Expect cold-rolled sheets to be tight for 60 to 90 days . . . Scrap prices stabilize.

Production . . . Steel production is expected to rise again this week, marking the eighth consecutive week of increase. Operations this week are scheduled at 75.0 pct of rated capacity, a gain of 1 point from the previous week. The steel ingot production is estimated at 110.3 (1947-49 = 100).

A strong influx of new orders from auto producers is putting more steam into a market that was already gaining steadily. While you can expect a temporary letdown toward the end of December, demand is expected to continue strong well into 1955. Still higher production rates may be expected in the weeks immediately ahead. Adding strength to steelmaking outlook was announcement by a major automaker that it would be shut down for model changes for only 2 weeks.

Delivery . . . Cold-rolled sheets, which are reflecting the sharpest recovery, are expected to be in tight supply for at least the next 60 to 90 days. Some producers are trying to increase output of their sheet mills in order to be able to take a bigger share of the new business.

Small users who had been getting quick delivery from mills are now scurrying to warehouses as rapidly extending mill delivery promises to

catch them with inadequate inventories. Warehouse buying is picking up, too, very sharply in some areas.

Demand . . . A somewhat milder pickup is being felt on hot-rolled sheets, hot and cold-rolled strip and plates. Galvanized sheets and tinplate, which have been consistently among the most popular products, are expected to ease seasonally during the next several weeks. But the overall outlook on flat-rolled products is for a tighter market.

Producers still expect structural demand to ease seasonally, but so far it is holding much better than had been anticipated. Same is true of oil country goods. Hot-rolled and cold-finished carbon and alloy bars are all stronger. This is an especially welcome development, as these products had been lagging badly earlier this year.

Scrap . . . After several weeks of mounting pressure and higher prices, scrap demand has leveled off, at least temporarily. Several steelmakers put additional blast furnaces back into operation in order to keep their scrap costs from mounting higher. Availability of the additional pig iron for steelmaking is acting as a brake on scrap prices.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week†	Last Week	Month Ago	Year Ago
Ingot Index (1947-49=100)	110.3	110.1	104.5	132.7
Operating Rates				
Chicago	78.5	78.5*	70.0	98.0
Pittsburgh	73.0	71.0	67.0	97.0
Philadelphia	64.0	64.0	58.0	93.0
Valley	69.0	69.0	59.0	96.0
West	81.0	77.5*	85.5	98.0
Detroit	94.0	94.0	89.0	90.0
Buffalo	87.5	75.5	56.5	106.5
Cleveland	78.5	71.0*	73.5	97.0
Birmingham	71.0	74.0	71.0	96.5
S. Ohio River	85.0	88.0	79.0	81.0
Wheeling	86.0	88.0	93.0	102.0
St. Louis	84.0	76.5	68.5	95.5
East	48.0	48.0	51.0	88.0
Aggregate	75.0	74.0	69.0	94.0

* Revised. † Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.798	4.798	4.801	4.634
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$33.33	\$33.00	\$30.17	\$34.17
Nonferrous				
Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.55	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	92.625	92.875	93.25	81.00
Zinc, E. St. Louis	11.50	11.50	11.50	10.00

Sheet Demand Paces Upswing

Automotive buying on in earnest . . . Scramble for cold-rolled sheets at Midwest mills . . . Some increase in bar strength . . . Structurals, wire feel seasonal decline.

♦ DEMAND for sheets has developed into a full-blown scramble in some producing areas, and the overflow is spreading into the more remote centers. Some mills are just about full through December and are putting pressure on production departments in the hope of squeezing more tonnage from their equipment.

In the Midwest, one producer has closed the door temporarily on accepting additional tonnage of cold-rolled sheets. Hot-rolled sheets and strip also are gaining strength.

With signs of strength popping up in all directions, some steel executives are puzzled by talk of a year-end slump. They admit there will be a seasonal decline in products sensitive to construction and farm buying, but it looks like other consuming industries will step into the breach.

Automotive buying is the No. 1 factor behind the market's resurgence, although demand from other outlets started the upward trend. A pleasant surprise from Detroit was Ford's announcement that its model-change shutdown will be of only 2 weeks' duration. This means that Ford purchasing will continue with hardly a change of pace. Other car producers are either in production or planning to start soon.

Oil country producers are still going strong even though consumers appear to be cutting inventories. Bars are stronger in some centers but still lagging in others. Plates are at best holding their own at a competitive level. Structurals are beginning to feel effect of seasonal influences, although this is not likely to be severe except in extreme temperature zones.

Considerable interest was created by Jones & Laughlin Steel Corp. announcement that it would spend \$55 million on an expansion program in 1955 (see p. 44).

SHEETS AND STRIP . . . The sheet market is still gathering steam. It is particularly volatile in Chicago, Cleveland, Detroit, and Pittsburgh. And the overflow is being felt in the East, where demand is increasing but backlogs are holding fairly steady. A Chicago area mill has had to stop taking orders for cold-rolled sheets; a producer of strip has advanced delivery from 2-3 weeks to 4-6 weeks; galvanized sheets are such that new orders might just as well be filed away until November when a seasonal slackening is expected. Cleveland is deluged with automobile orders and sheet and strip are sold out through November and into December; one mill is sold out through balance of year on 30-in. sheets and over and is booking for January delivery.

BARS . . . While slower to gain strength than sheets, the bar market has picked up in some centers. Chicago reports that farm equipment buying is strengthening cold-finished bars which also are receiving support from automotive and appliances; but warehouse buying leaves something to be desired; hot-rolled is on short delivery but picking up. There's a

Purchasing Agent's Checklist

- PLASTIC PIPE:** Steel producers join the parade p. 41
- SCRAP:** Begin study of possible export limitations p. 48
- FASTENERS:** An upsurge for this industrial bellwether p. 51
- DEFENSE:** See an upturn in 1955 Pentagon buying p. 69

noticeable pickup on carbon bars in the East. Detroit sales offices report generally good bar business.

PLATE AND STRUCTURALS . . . Structurals market is losing its zip, apparently due to seasonal easing in construction. Chicago finds that highway construction is pushing heavy structurals but overall demand has leveled off or is slipping; light structurals are stronger but deliveries continue at 2-3 weeks. In the East, structurals are good and getting better. Plates are readily available everywhere.

PIPE AND TUBING . . . Oil country goods continue strong even though consumers are reducing inventories. Merchant pipe demand is good, bolstered by construction and other outlets. Chicago notes an improvement.

WIRE . . . General picture is good. Pittsburgh reports merchant wire off seasonally but this is offset by pickup in manufacturers' wire; construction products slackening. Chicago finds jobbers caught with low inventories are in forced buying position; even merchant products continue strong. East is off seasonally on merchant wire.

WAREHOUSE . . . Strong demand for sheets at mill level appears to be benefiting the warehouses. Chicago distributors report general volume is even better than expected; sheets are leading the advance. On the West Coast, a slow, steady improvement is noted.

IMPORT . . . As of Oct. 15, import prices were increased. Following table gives prices per 100 lb., landed, duty paid at East Coast ports, North and South Atlantic, for September and October:

	Sept. 15	Oct. 15
Deformed bars, intermediate grade,		
ASTM-A-305	\$4.95	\$5.05
Bar size angles	4.55	4.60
Structural angles	4.50	4.55
I-beams and channels	4.40	4.50

EXTRA REVISIONS . . . U. S. Steel Corp. has revised quantity extras on hot-rolled carbon and alloy bars to bring charges into line with costs on small-lot orders (under 3 tons). Extra charges for odd-sized flats also were revised upward to reflect cost of downtime for roll changes. U. S. Steel also revised upward prices of columbium-stabilized stainless steel grades.

Comparison of Prices

(Effective Oct. 26, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.
Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Oct. 26 1954	Oct. 19 1954	Sept. 28 1954	Oct. 27 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05#	4.05#	4.05#	3.925#
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.82	5.82	5.82	5.575
Plate	4.225	4.225	4.237	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stain's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.05	\$9.05	\$8.95	\$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.65	7.65
Special coated mfg. ternes	7.85	7.85	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30#	4.30#	4.312#	4.15#
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75#	5.75#	5.75#	5.525#
Rails: (per 100 lb.)				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Re-rolling billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, re-rolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675#	4.675#	4.675#	4.525#
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.798#	4.798#	4.801#	4.684#

	Oct. 26 1954	Oct. 19 1954	Sept. 28 1954	Oct. 27 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.19	\$61.19	\$61.19	\$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti.	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50#	9.50#	9.50#	10.06#
† 74-76 pct Mn base.				

Pig Iron Composite: (per gross ton)				
Pig iron	\$56.59	\$56.59	\$56.59	\$56.59

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$34.50	\$34.50	\$31.50	\$37.50
No. 1 steel, Phila. area	31.00	31.00	28.50	31.50
No. 1 steel, Chicago	33.50	33.50	30.50	33.50
No. 1 bundles, Detroit	26.50	26.50	26.50	27.50
Low phos., Youngstown	35.50	35.50	32.50	39.50
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	43.50
No. 1 mach'y cast, Philadel'a.	42.50	42.50	41.00	41.00
No. 1 mach'y cast, Chicago	43.50	43.50	42.50	38.00

Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$33.00	\$33.00	\$30.17	\$34.17

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.33	\$14.33	\$14.33	\$14.75
Foundry coke, prompt	16.75	16.75	16.75	16.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.75†
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	98.625†	92.875*	93.25	81.00
Zinc, East St. Louis	11.50	11.50	11.50	10.00
Lead, St. Louis	14.80	14.80	14.55	13.50
Aluminum, virgin ingot	22.20	22.20	22.20	21.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on P. 135 →

Producing Point	Basic	Fbry.	Mall.	Beas.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo III	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	56.50	57.00	
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50		
Duquesne L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	56.50	57.00	
Erie I4	56.00	56.50	56.50	57.00	
Everett M6		61.00	61.50		
Fontana K7	62.00	62.50			
Genoa, Utah C7	56.00	56.50			
Granite City G2	57.90	58.40	58.90		
Hubbard Y1			56.50		
Minneapolis C6	58.00	59.00	59.00		
Monessen P6	56.00				
Neville I4	56.00	56.50	56.50		
Pittsburgh U1	56.00		57.00		
Sharpsville S3	56.00	56.50	56.50	57.00	
Sa. Chicago R3	56.00		56.50		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedenland A2	58.00	58.50	59.00	59.50	
Tokela I4	56.00	56.50	56.50	57.00	
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	
N. Tawanda T1		56.50	57.00		

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 3¢ per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 35¢ per ton for phosphorus content 0.70 and over.

Silvery Iron: Buffalo, H1, \$63.25; Jackson, J1, \$147.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferro-silicon prices are \$1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingot, re-rolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, re-rolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25		27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75	50.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, El; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher) W1 (25¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, I4.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

Copper Use Hits Year's High

Fabricators got least, shipped most in September

... Stocks tumble ... Unfilled orders rise ... Government copper on market, prevents shutdowns—By R. L. Hatschek.

◆ TENSIONS in the nonferrous markets were considerably easier last week than they had been for some time. This is, of course, particularly true in copper now that strikers are back at work and the government has started pumping metal into the empty pipelines.

This does not mean, however, that the copper market has turned soft—supplies are still short and only quick government action prevented actual plant shutdowns for lack of the red metal.

September was a big month in copper—consumption, at 106,454 tons, was the highest since October 1953. Copper Institute statistics also show that deliveries to fabricators from primary sources totaled only 88,947 tons. Big dip, of course, was the result of strikes.

Combination of heavy use and light intake cut nearly 18,000 tons from fabricator stocks, that figure dropping from 359,474 tons at the beginning of September to 341,649 tons at the beginning of this month. Tabulation also shows a 17,300-ton increase in unfilled orders which brings the total to 148,817 tons at the beginning of October. This is the biggest tonnage of unfilled orders so far this year.

Elsewhere in the major nonferrous metal markets things were quiet. Lead and zinc are coasting along without any significant change as sellers wait for Novem-

ber buying to grow. Aluminum production slipped a bit further in September but it's nothing for any consumer to worry about.

COPPER ... Quick injection of government copper into the market came just about in the nick of time for some consumers. Sales were limited to those who were facing imminent shutdown because of the strike-induced shortage and tonnages started moving last week.

There were no further price cuts in copper scrap last week but one of the smaller ingot makers did cut his selling prices by $\frac{3}{4}$ ¢ to 2¢ per lb. The move, however, was not followed by other ingot makers and the tonnage represented is small.

Shipments of ingot brass and bronze during September edged a bit higher than the previous month's and stand at the best level since April. Tonnage was 22,464.

ALUMINUM ... September production of primary aluminum slipped to 120,332 tons from August's 31-day total of 125,296 tons. Decline from the record production rate of 126,162 tons in July results from lack of hydro power in the Southeast. However, the industry is now pretty well reconciled to this happening every year and takes it into consideration in making out schedules. So far this year the power situation is definitely not too bad despite the slight cutback.

Total output for the year passed the 1-million ton mark in September and it looks like a safe bet that 1954 total will top 1.45 million tons.

Highlighting the power situation, Aluminum Co. of America is planning to build a dam on the Little Tennessee River in Blount and Monroe Counties, Tenn. An agreement with TVA has been reached and construction on the \$10 million project will start next spring if Federal Power Commission will issue a license.

Capacity of 70,000 hp will be used for smelting and fabricating operations at the firm's Alcoa, Tenn., plant.

Expansion of alumina facilities at the Baton Rouge, La., plant of Kaiser Aluminum & Chemical Corp. is nearing completion after 3 years of construction. The \$27 million job will make the plant capable of handling 2 million tons of bauxite annually and will take care of all of Kaiser's alumina requirements.

ZINC ... In the tug-of-war between domestic and foreign zinc prices, lack of consumer demand is acting to prevent any increase while stockpile policy is working to prevent a decline. Market has been definitely on the quiet side with October buying done and no significant purchasing for November yet evident early this week. Stockpile buying, now through for the month, has been the only factor to maintain strength in zinc and it seems to be effectively preventing any price dips. On the other hand, foreign metal has been offered for sale here at about $\frac{1}{2}$ ¢ cheaper than the domestic price. London market closed last week at about $\frac{3}{4}$ ¢ below parity with the New York market.

Sellers of the metal, however, were looking forward to considerable improvement in the buying rate during the next month.

LEAD ... Situation in lead was somewhat different with London maintaining an edge over New York equivalent prices. Sales last week were termed only moderate but the tone of the market is definitely steady.

Consumption figures, as reported by the Bureau of Mines for the first 8 months of the year, show a decline of some 10 pct from 1953. Total through August was 719,000 tons. But the August figures themselves were definitely brighter than the preceding month, showing a rise of 18 pct to 95,654 tons.

Lead battery shipments showed the usual fall upturn during September but the total was still below September of last year and the year before. Shipments so far this year are almost 17 pct below the 9-month total scored in '53.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Oct. 20	Oct. 21	Oct. 22	Oct. 23	Oct. 25	Oct. 26
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	92.875	93.125	92.75	92.625	92.625*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices

*Tentative

Nonferrous Prices

(Effective Oct. 26, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb. f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet		Plate	
	0.032 in.	0.081 in.	0.136-0.249 in.	0.250-3.000 in.
1100, 3003.....	38.1	36.1	34.9	34.5
3004.....	43.0	38.8	37.1	36.6
5052.....	45.7	40.9	39.2	38.3
2024-O, -OAL.....	48.4	39.8	38.3	38.4
7075-O, -OAL.....	59.8	48.1	45.8	45.8

Extruded Solid Shapes: Shape factors 1 to 5, 37.7¢ to 55.7¢; 12 to 14, 38.4¢ to \$1.03; 24 to 26, 41.2¢ to \$1.34; 36 to 38, 48.8¢ to \$1.96.

Rod, Round: Rolled, 1.064-4.5 in. 1100-F, 42.6¢ to 39.1¢; cold finished, 0.375-3.499 in., 1100-F, 46.9¢ to 41.4¢.

Screw Machine Stock: Rounds, 2011-T3, 1/4-11/32 in., 62.5¢ to 49.1¢; 3/8-1 1/2 in., 48.9¢ to 45.9¢; 1 1/2-3 in., 44.7¢ to 41.7¢. Base \$800 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 46.1¢ to 34.8¢; 5052, 55.7¢ to 43.4¢; 2017-T4, 63.3¢ to 43.7¢; 6061-T4, 58.5¢ to 43.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1 1/4-2 in., 45.4¢ to 63.8¢; 2-4 in., 39.3¢ to 53.5¢; 4-6 in., 39.8¢ to 48.8¢; 6-9 in., 40.4¢ to 51.1¢.

Roofing Sheet: Flat, per sheet, 0.032-in. 42% x 60-in., \$2.918; x 96-in., \$4.672; x 120-in., \$5.841; x 144-in., \$7.009. Coiled sheet, per lb, 0.619 in. x 28 in., 29.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: F31-O 1/4 in., 56¢; 3/16 in., 57¢; 1/8 in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M. diam 1/4 to 0.311 in., 77¢; 1/2 to 3/4 in., 60.5¢; 1 1/4 to 1.749 in., 66¢; 2 1/2 to 5 in., 51.5¢. Other alloys higher. Base up to 3/4 in. diam, 10,000 lb; 3/4 to 2 in., 29,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. in weight per ft. for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.5¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M. 0.049 to 0.057 in. wall thickness: OD 1/4 to 5/16 in., \$1.43; 5/16 to 3/4 in., \$1.29; 3/4 to 1 in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, 3/4 to 1 in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1 1/4 in., 10,000 lb; 1 1/4 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$11; Bar, HR or forged, \$6; Forgings, \$6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86 1/2	67 1/2	92 1/2
Strip, CR	92 1/2	70 1/2	98 1/2
Rod, bar	82 1/2	65 1/2	88 1/2
Angles, HR	82 1/2	65 1/2	88 1/2
Plate, HR	84 1/2	66 1/2	90 1/2
Seamless tube, 1 1/2 in.	100 1/2	137 1/2	
Shot, blocks	60		

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	44.73	48.48
Copper, h-r	48.33	44.73	
Copper, drawn	45.98		
Low brass	44.47	44.41	
Yellow brass	41.72	41.66	
Red brass	45.44	45.28	
Naval brass	45.76	40.07	
Lead brass			39.11
Com. bronze	46.95	46.89	
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36		62.63
Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.			
Strip			\$1.68
Rod, bar, wire			1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	22.20
Aluminum pig	30.50
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb cont'd Be.	\$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	\$72.75
Bismuth, ton lots	\$2.25
Cadmium, del'd	\$1.70
Cobalt, 97-99% (per lb)	\$2.60 to \$2.67
Copper, electro, Conn. Valley	30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., per troy oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$165 to \$175
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
Ingot	27.75
Magnesium, sticks, 100 to 500 lb, 46.00 to 48.00	
Mercury, dollars per 76-lb flash, f.o.b. New York	\$328 to \$330
Nickel electro, f.o.b. N. Y. warehouse ..	63.03
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	\$21.00
Platinum, dollars per troy oz.	\$84 to \$87
Silver, New York, cents per troy oz.	55.25
Tin, New York	92.625
Titanium, sponge, grade A-1	\$4.72
Zinc, East St. Louis	11.60
Zinc, New York	12.00
Zirconium copper, 50 pct	\$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.50
No. 120	29.00
No. 123	28.50
80-10-10 ingot	
No. 305	34.00
No. 315	31.75
88-10-2 ingot	
No. 210	42.75
No. 215	39.25
No. 245	34.75
Yellow ingot	
No. 405	25.25
Manganese bronze	
No. 421	27.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	23.75-24.00
0.60 copper, max.	23.50-23.75
Piston alloys (No. 122 type) ..	21.25-22.25
No. 12 alum. (No. 2 grade) ..	20.75-21.00
108 alloy	21.50-21.75
195 alloy	22.50-24.00
13 alloy (0.60 copper max.) ..	23.50-23.75
ASX-679	21.50-21.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97 1/2%	21.00-22.00
Grade 2—92-95%	20.00-21.00
Grade 3—90-92%	19.75-20.00
Grade 4—85-90%	18.50-19.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	42.64
Electrodeposited	41.88
Flat rolled	45.04
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	\$1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94%

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.00
Copper sulphate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75 1/2
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	36 1/4
Yellow brass	19 1/2	18
Red brass	23	22 1/4
Comm. bronze	23 1/2	23 1/4
Mang. bronze	18 1/2	17 1/2
Yellow brass rod ends	19 1/2	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27 1/2
No. 2 copper wire	26
Light copper	24 1/2
*Refinery brass	24 1/2
*Dry copper content.	

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27 1/2-27 1/2
No. 2 copper wire	26 1/2-26
Light copper	24 1/2-24 1/2
No. 1 composition	22 1/2-22 1/2
No. 1 comp. turnings	21 1/2-22 1/2
Roller brass	18-18 1/2
Brass pipe	18 1/2-18 1/2
Radiators	18 1/2

Aluminum

Mixed old cast	14-14 1/2
Mixed new clips	14 1/2-14 1/2
Mixed turnings, dry	14 1/2-14 1/2
Pots and pans	14-14 1/2

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	25
No. 2 heavy copper and wire	24
Light copper	22
New type shell cuttings	21 1/2-22
Auto radiators (unsweated) ..	17-17 1/2
No. 1 composition	20-20 1/2
No. 1 composition turnings ..	19-19 1/2
Unlined red car boxes	17-17 1/2
Cocks and faucets	17-17 1/2
Mixed heavy yellow brass	13 1/2
Old rolled brass	16 1/2
Brass pipe	17 1/2
New soft brass clippings	17 1/2-18
Brass rod ends	15 1/2-16
No. 1 brass rod turnings	13 1/2-14

Aluminum

Alum. pistons and struts	7 1/2-8 1/2
Aluminum crankcases	11
2S aluminum clippings	14 1/2
Old sheet and utensils	11
Borings and turnings	7-7 1/2
Misc. cast aluminum	11
Dural clips (24S)	13 1/2

Zinc

New zinc clippings	7
Old zinc	8 1/2
Zinc routings	3 1/2-3 1/2
Old die cast scrap	3 1/2-3 1/2

Nickel and Monel

Pure nickel clippings	55
Clean nickel turnings	38
Nickel anodes	55
Nickel rod ends	55
New Monel clippings	22-23
Clean Monel turnings	15-16
Old sheet Monel	20-21
Nickel silver clippings, mixed.	15
Nickel silver turnings, mixed.	13

Lead

Soft scrap lead	12-12 1/2
Battery plates (dry)	6 1/2-6 1/2
Batteries, acid free	4.35-4.60

Magnesium

Segregated solids	18 1/2-19
Castings	17 1/2-18

Miscellaneous

Block tin	75-80
No. 1 pewter	55-60
No. 1 auto babbitt	48
Mixed common babbitt	14
Solder joints	17 1/2
Siphon tops	45
Small foundry type	16 1/2-16 1/2
Monotype	15-15 1/2
Lino. and stereotype	14 1/2-14 1/2
Electrotype	12 1/2-12 1/2
Hand picked type shells	10 1/2-10 1/2
Lino. and stereo. dross	8 1/2
Electro dross	5

Trading, Prices on Plateau

Market virtually unchanged . . . Composite price edges up to \$33.33, a new high for the year . . . Higher blast furnace output ups turnings . . . See more hot metal use.

♦ "STEADY as she goes" about sums up the iron and steel scrap market in most steelmaking areas this week. Order volume and prices seem to be on the same plateau as last week. THE IRON AGE Heavy Melting Steel Scrap Composite Price eased up to \$33.33 a ton, setting another new high for the year. New domestic buying in the East caused the boost.

For report of last week's Washington hearings on scrap iron and steel exports see p. 48, this issue—Ed.

Major development was a strengthening of turnings grades as steel mills stepped up blast furnace activity. But dealers and brokers viewed this with mixed feelings: With foundries working hard to stay afloat, more blast furnace output could only mean more use of hot metal at the open-hearths, with corresponding cuts in scrap charges.

Pittsburgh . . . Market is strong but in absence of new business most prices held unchanged this week. Ingot rate continued to rise in this district but consumers are attempting to offset this by bringing in additional blast furnaces. This in turn has tended to firm up blast furnace grades. An independent mill was reported planning to re-enter the market soon, perhaps this week. Low phos is up \$1 per ton on basis of a sale.

Chicago . . . With volume continuing good though with some drying up in foundry grades, Chicago scrap continued to move at good prices. A reported buy of No. 2 heavy melting at \$31, a drop of \$2 below the price reported the previous week, could not be confirmed at press time. Reported offerings of \$36 on RR No. 1 heavy, \$16 on machine shop turnings were also rumored, but scrap continued to move at previous prices, and a sale of No. 1 heavy melting at \$34 further

served to peg the market. Rumors of sales at lower prices, while they had not had any strong effect on broker buying prices at press time, did result in freer movement of No. 2 heavy melting on old orders. Meantime, broker buying of No. 2 heavy melting at \$31 continued. Reports of some broker purchasing of the grade at \$31.50 could not be confirmed.

Philadelphia . . . New domestic sales early this week were made at prices \$1 higher for No. 1 and No. 2 heavy melting, No. 1 and No. 2 bundles and machine shop turnings. Dealer competition for scrap is also markedly warmer than it has been previously. Strength is keyed to the rising ingot rate and export business.

New York . . . Market here continues calm. Exports are holding their own, and domestic buying of steel-making grades is freshening, although still not so heavy as some in the trade would like to see. Increased blast furnace activity has strengthened turnings grades, but dealers and brokers moderate any enthusiasm they might feel by reflecting that this probably means increased hot metal use.

Detroit . . . Prices have remained almost static on the basis of slow but steady buying but little outside interest. As a result, general price levels have reached a point where they are equalized with other consuming areas on the basis of the freight differential. No. 2 grades are particularly soft, but little tonnage is being generated and little purchased. Release of a large order of turnings kept the price of blast furnace grades from slumping. Unless outside market strength reaches into Detroit, the market may take a softer tone.

Cleveland . . . Closing of all major industrial lists due late this week is bringing on a wait and see feeling among mills and dealers while market remained inactive last week. Automotive and industrial lists have increased steadily in volume due to increase in

production and higher tonnage of premium grades is becoming available. Dealers are showing tendency to hang on to present stocks in hope of an increase, to some extent for end of year tax purposes. Valley market following similar trend except some mills planning major purchases next month. Due to proofreading error, THE IRON AGE prices for some railroad grades in the Cleveland area were garbled in the issues of Oct. 14 and Oct. 21. For Oct. 14, prices should have been: Rails 3 ft and under, \$47.00 to \$48.00; Rails 18 in. and under, \$48.00 to \$49.00; Railroad cast, \$44.00 to \$45.00; Steel axle turnings, \$23.00 to \$24.00. For Oct. 21, Rails 3 ft and under, \$47.00 to \$48.00; Rails 18 in. and under, \$49.00 to \$50.00; Railroad cast, \$44.00 to \$45.00; Steel axle turnings, \$24.00 to \$25.00.

Birmingham . . . A scarcity of No. 2 steel in the district is causing brokers once again to pay more than they are getting for this item, although No. 2 bundles are still plentiful. Quotations for exports are now at \$31.00 for No. 1 steel, \$29.00 for No. 2 steel and \$26.00 for No. 2 bundles f.a.s. Carolina ports.

St. Louis . . . Steel operations are up to 84.1 pct, highest since December 1953. MoPac Railroad sold 40 cars of No. 1 RR heavy melting steel at unchanged prices. Market is strong at unchanged prices.

Cincinnati . . . Demand for rail scrap and turnings and borings for out of town shipment has picked up noticeably but overall market has quieted down pending closing of lists.

Buffalo . . . Bullish tendencies continue to rule the scrap market here. A further advance of 12 points in the ingot production rate will probably lead to higher prices next week when a leading mill is expected to place new orders.

Boston . . . Export business continues to run very well in the New England area—especially for No. 1 heavy melting steel. On the domestic side, Pittsburgh is reported "ordering larger trickles."

West Coast . . . Scrapmen in San Francisco are bulging with optimism unheard of here for months. They feel prices are slated to increase. Several boatloads of scrap are now loading for Europe. Mills aren't meeting export competition because inventories are still good. Talk continues that scrap prices are in for a hike, but mills are resisting any change.